APPENDIX E

ECOLOGICAL EFFECTS ASSESSMENT AND COMPENSATORY MITIGATION REPORT

JACKSONVILLE HARBOR NAVIGATION (DEEPENING) STUDY

DUVAL COUNTY, FLORIDA

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Jacksonville Harbor General Re-evaluation Report (GRR) II
Ecological Effects Assessment and Compensatory Mitigation Report

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1 Introduction

The U.S. Army Corps of Engineers, Jacksonville District (USACE) is conducting an effects assessment to evaluate effects and required mitigation for the proposed deepening of the Jacksonville Harbor Federal Navigation Project. The assessment area is located in the Lower St. Johns River (LSJR). The LSJR is an estuarine system in which salt water from the ocean mixes with fresh water from the upper reaches of the St. Johns River and from tributaries discharging into the river. Salinity in the LSJR varies from oceanic levels at the river entrance to freshwater levels in the upper river. Many of the ecological communities and individual plant and animal species inhabiting the river respond to specific salinity conditions which set their habitat range or affect their life cycles. Potential environmental changes from the Jacksonville Harbor deepening include alteration of salinity in portions of the LSJR (Taylor 2013).

In accordance with the Council on Environmental Quality (CEQ) Section 1508.20/Engineering Regulation (ER) 1105-2-100, authority and regulations pertaining to mitigation include:

a) Avoiding the impact altogether by not taking a certain action or parts of an action.

b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

e) Compensating for the impact by replacing or providing substitute resources or environments.

Per parts (a) and (b), avoidance and minimization measures included a reduction in project footprint. The USACE and its non-Federal sponsor, the Jacksonville Port Authority, have agreed to delete Segment 2 (River Mile [RM] 14-20) and Segment 3 (West Blount Island Channel) from the study. This would result in fewer direct effects (less dredging) as well as reduced indirect effects to the LSJR ecosystem, i.e. salinity induced effects on biota. Additionally, a sill, or physical barrier was evaluated to reduce upstream salinity. Hydrodynamic modeling analysis indicated that all of the sill options would not provide sufficient benefits to be further considered (see Appendix A). The LSJR is a well mixed river that does not exhibit salinity stratification which makes the use of a sill inappropriate.

The area near the mouth of the St. Johns River (River Miles 0 - 7) includes the U.S. Naval Station at Mayport, the confluence of the Intracoastal Waterway and the river immediately west of the Naval Station. Extensive salt marshes exist north and south of the main river channel and along the Intracoastal Waterway to the north and south. The shoreline along River Miles 7 to 25 is largely urbanized, comprising the City of Jacksonville, port facilities, electric generation facilities, residential areas, and other waterfront features such as dredged material management facilities. Though largely urbanized, this area includes several tributaries, including the Pottsburg and Clapboard and Dunn Creeks, the Trout, Broward, and Arlington Rivers. Urbanization continues upstream from River Miles 25 to 43, where much of the shoreline comprises urban or suburban communities. Within this region, tributaries include the Cedar and Ortega Rivers, Doctors Lake, and Julington Creek. Between River Miles 43 and 68, fringing swamps, SAV, and emergent vegetation, farmland, and minor residential areas occur near the river shoreline. Larger tributaries in this area include Black Creek, Trout Creek, Six Mile Creek, and Deep Creek. Upstream of River Mile 68, the region east of the river is dominated by farmland with fringe swamps, emergent vegetation, and SAV beds along with river edge residential development and the town of East Palatka (about river mile 80). On the west side of the river upstream of River Mile 68, areas of swampland, the confluence of Rice Creek with the river and the town of Palatka waterfront (river mile 80) are dominant shoreline features. Upstream of River Mile 80 swamps and interspersed residential development are the primary shoreline land forms and uses.

The St. Johns River Water Management District's, *St. Johns River Water Supply Impact Study* (SJRWMD 2012) provided an initial framework for assessing ecological effects of salinity changes due to the Jacksonville Harbor deepening project. The USACE recognized the concerns expressed by stakeholders in regard to the Water Supply Impact Study (WSIS). The USACE has supplemented information obtained from the WSIS with new information, i.e. more recent bathymetric data on the river channel. The USACE study, including the models, were and continue to be internally evaluated by the Jacksonville District and other qualified entities within the USACE. An external peer review will also be performed. Additionally, the public and agencies will have opportunities to review and comment on the modeling.

Numerical hydrodynamic models using Environmental Fluid Dynamics Code (EFDC) provided a tool for simulating salinity concentrations and river circulation. Ecological models were then developed to examine potential salinity effects to wetlands, submerged aquatic vegetation (SAV), fish, and macroinvertebrates (Taylor 2013). An ecological model was also evaluated to assess potential effects to plankton caused by changes in water age or water residence time (Taylor 2013). Hydrodynamic and ecological modeling, including wetland modeling of selected tributaries, as well as fish and macro invertebrate modeling for the mainstem and tributaries, is ongoing. Updated information will be provided to stakeholders as it is completed. Updates will be provided on the project website at the following address:

http://www.saj.usace.army.mil/Missions/CivilWorks/Navigation/NavigationProjects/JacksonvilleHarborChannelDeepeningStudy.aspx.

The USACE has used a conservative approach during the modeling efforts. A conservative approach was also utilized when best professional judgment was applied to evaluate project effects. Any additional results or conclusions derived from ongoing modeling will be addressed at that time.

The Jacksonville Harbor deepening project is predicted to increase upstream salinity levels within the LSJR, effecting some wetland vegetation, SAV, and aquatic-based organisms. The proposed project will shift the estuarine ecosystem upstream, increasing the amount of brackish water -based habitat and reducing the amount of fresh water-based habitat. This effects assessment and mitigation report focuses on potential project effects to wetlands and SAV.

1.1 Ecological Model

To ensure that the effects analysis provided conservative (i.e., greater than average) predictions of the potential project effects, the USACE evaluated the project when salinity conditions in the LSJR were higher than the average conditions. From the available SJRWMD model input data, the USACE selected a period of six consecutive years that included three consecutive dry years (i.e., years with very low river flow and high river salinity). This selected period, 1996 – 2001, represents the six-year evaluation period for the all of the model simulations. The USACE further concluded that the 1996 – 2001 evaluation period contained one of the lowest (driest) three consecutive year flow periods in the available 78-year flow record. Thus, the USACE's selection of the evaluation period, provided for a conservative evaluation of potential project effects. The USACE used the SJRWMD 1995 land use data in lieu of the SJRWMD 2030 projected land use data.

The initial model simulations were run to examine salinity effects to the mainstem of the LSJR. To establish baseline conditions for the LSJR, No-Action modeling runs were conducted for the estimated time of construction (year 2018, if project is authorized and appropriated) and for the future without project (year 2068). The 2018 No-Action (2018-Baseline) simulation represents the site as it would exist at the time of project construction with the existing 40 ft channel depth. The 2018 No-Action includes the bathymetry for the recently completed deepening of the Federal Navigation Channel for Naval Station-Mayport as well as the proposed construction of the Mile Point Training Wall Reconfiguration project. The 2018 No-Action simulation does not include Sea Level Rise (SLR) and Public Water Withdrawal (PWW) conditions. The 2068 No-Action (2068-Baseline) simulation represents the site as it would exist at the 50 year project lifetime, with the existing 40 ft channel depth, bathymetry of the deepened Mayport Channel, proposed construction of the Mile Point Training Wall Reconfiguration project, and the inclusion of 0.39 ft SLR (the historic rate) and SJRWMD predicted 155 million gallons per

day of PWW. Although a specific 'Existing Conditions' model run was not conducted, the 2018-Baseline model run would be the same as both runs would utilize the same 6-year simulation period, harbor depth at 40-feet, and other model input conditions.

In addition to the 2018 No-Action, three 2018 alternative model runs were conducted at 44 ft depth, 46 ft depth, and 50 ft depth. These three runs represent the project alternatives at the time of construction. Like the 2018 No-Action simulations, they do not include consideration of SLR and PWW, but do include bathymetry of the recently deepened Mayport Channel, as well as the proposed construction of the Mile Point Training Wall Reconfiguration project.

In addition to the 2068 No-Action, three 2068 alternative model runs were conducted at 44 ft depth, 46 ft depth, and 50 ft depth. All four 2068 model runs include bathymetry of the deepened Mayport Channel, proposed construction of the Mile Point Training Wall Reconfiguration project, and the inclusion of 0.39 ft SLR (the historic rate) and 155 million gallons per day of PWW.

Reference is made to Appendix A of this report for a detailed explanation of project depths, including overdepths and advanced maintenance areas. For the purpose of this assessment, the 46 ft simulated depth was evaluated to represent the Tentatively Selected Plan, which is the Locally Preferred Plan (LPP) of 47 ft depth.

In regards to a comparison of the 45-ft NED plan versus the 47-ft LPP, the effective differences between these two alternatives are difficult to discern, particularly when including uncertainties that exist in assessing project effects. Only one assessment was made for each wetland and SAV effect for all runs.

A comparison of future without (2068 No-Action) to future with project (2068-46 ft) conditions was used to assess effects of the proposed deepening on salinity-dependent LSJR wetlands and SAV communities. This comparison is noted in the main report. However, for the wetland model, there are no discernible differences between the 2068 No-Action run and the 2068 alternative model runs. It is possible that the solo or combined effects of SLR and/or PWW are masking the lesser effects of the proposed project. Therefore, evaluation of wetland effects was based on a comparison of the 2018 No-Action model run with the 2018 alternatives. These model runs, which do not include SLR or PWW, clearly show the salinity effects of the project within the main stem of the LSJR and could therefore be utilized to conduct a functional assessment.

1.2 Assessment Method

While the models provided information relative to physical changes to salinity ranges under the model simulated conditions, the Uniform Mitigation Assessment Method (UMAM) was used to assess how the changes in salinity would affect the functions of wetlands and also to determine the mitigation needed to offset the functional effects. Mitigation options include

preservation, enhancement, restoration, and creation of wetlands, as well as the evaluation and use of mitigation banks, pursuant to the Mitigation Rule of 2008. UMAM was also implemented to assess the potential salinity effects to SAV along the main stem of the LSJR and associated mitigation for these effects.

The use of UMAM is required per Florida Statute to assess these effects and determine mitigation acreage. In accordance with Section 401 of the Clean Water Act, the USACE will apply for water quality certification from the State of Florida, and a UMAM assessment will be required for certification and for State concurrence with the USACE determination that the project is consistent with the state's coastal zone management program to the maximum extent practicable.

1.3 Interagency Assessment Team

An interagency assessment team was assembled to assist in conducting the UMAM assessments for potential effects associated with the proposed deepening of Jacksonville Harbor. The team was composed of representatives from the following agencies: USACE, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), Florida Department of Environmental Protection (FDEP), and Florida Fish and Wildlife Conservation Commission (FFWCC). Numerous meetings and site visits were conducted to gain a consensus on the characterization of the wetland areas and effects related to the proposed project.

2 Wetlands

Predicting the effects of harbor deepening and potential salinity migration upstream is a complex and challenging task. Reference studies are still in early development, as ecosystem changes do not occur abruptly and considerable time may pass before effects become noticeably apparent. In order to reduce uncertainty involved in the analysis, the USACE relied on information gained from the Cape Fear Deepening Project in the Wilmington District (Hackney 2013), hydrodynamic and ecological modeling that was conducted by the USACE, and local expertise in wetland function and assessment. This report documents the results of the EFDC and ecological modeling, and provides numerous wetland descriptions, photographs and data sheets that were compiled during the functional assessment.

2.1 Effects of Salinity Increases in Freshwater Systems

As would be expected, increasing salinity affects the function of freshwater wetland systems in a number of different ways, but will typically convert them to salt marsh or other estuarine habitat. The intensity of the effects is dependent on several factors, but mainly corresponds to the salinity concentration in the water and soil combined with the

frequency of inundation. Effects are graduated as distance from a saltwater source increases. Downstream freshwater wetlands near saltwater sources receive higher salinity levels and frequencies and can change fairly rapidly within a temporal, ecological scale. Within the project area, mortality of fresh water vegetation combined with re-colonization of the area by a more salt tolerant species such as *Spartina alterniflora* (Saltmarsh Cord Grass) and *Spartina bakeri* (Sand Cord Grass) will occur. Regarding soils, the increases in salinity cause an increase in hydrogen sulfide production along with a decrease in soil stability. Soil elevations in these tidally-influenced areas may actually decline, leading to more frequent tidal flooding and thus increased effects.

Areas located more upstream but still within moderate salinity ranges experience more subtle changes, for instance stunting of trees such as *Acer rubrum* (Red Maple) and *Ulmus americana* (American Elm) and shifts in groundcover to species that are more tolerant of higher salinities. This habitat shift would actually favor some estuarine fish, some species of shrimp, and other typical estuarine-based species, but would result in some decline for freshwater aquatic species. These areas typically experience graduated conversion over a much longer time frame, and can be highly influenced by weather patterns and fluxes of freshwater that can sometimes reverse trends for periods of time. Continuing even further upstream, as salinity concentrations and frequencies of inundation decline, salinity effects become undetectable and the wetlands transition into a normal freshwater, tidal swamp.

Based on observations from the Cape Fear Deepening Project, three zones were created that were used to describe affected areas and quantify results. These three areas are tidal marsh, transitional, and tidal swamp (Hackney 2013). For the purposes of this report the following sections provide brief descriptions and photos of these zones within the project area.

2.2 Zones of Effect

2.2.1 *Tidal Marsh*

Tidal Marsh areas are described in this report as those within the LSJR that would have >25% frequency of equal to or greater than 1 ppt high tide salinity. These areas are "dominated by species of herbaceous vascular plants with varying tolerance to saline water" but may include a continuum of wetlands transitioning to forested swamp as the gradient shifts to upland. Wetlands observed at the Dinsmore boat ramp (Figure 1) along the Trout River are a typical salt marsh in northeast Florida with a high tidal range. Dominant species were *Spartina alterniflora* and *Juncus roemerianus* (Black Needlerush) with *Spartina cynosuroides* (Big Cord Grass) in higher elevations.

Figure 1. Trout River at Dinsmore boat ramp: typical northeast Florida salt marsh with high tidal range

2.2.2 *Transitional Wetlands*

Transitional areas are those that would have <25% and >12% frequency of equal or greater to 1 ppt high tide salinity. These areas are in a state of flux, with changing composition of canopy, sub-canopy and ground cover occurring throughout the zone. These systems are dominated by tidal, freshwater plant species of varying rates of salinity tolerance. Downstream portions of this zone typically display the most noticeable effects of salinity, with colonization by salt marsh species and near complete tree mortality. Moving upstream, *Taxodium distichum* (Bald Cypress) populations increase, and salt marsh species become scarcer. Unhealthy tree species other than Cypress and snags are scattered throughout, and ground cover will be dominated by salt-tolerant, freshwater species. Towards the upstream portion of this zone, other canopy species become more prevalent, although they still display some reduced growth and recruitment. Ground cover is dominated by freshwater species, but those that are completely salt intolerant will still not inhabit this zone.

A prime example of a transitional wetland area is located along the Ortega River upstream of the confluence of Cedar River. The portions of the wetlands nearest the Ortega River (Figure 2) that receive more frequent tidal effects are almost extensively herbaceous except for an occasional *Juniperus silicicola* (Southern Redcedar). The dominant species at the site is *Echinochloa sp*. (millet), with an estimated 75% coverage across the western half of the site. Other species consist of *Spartina bakeri* (Sand Cordgrass), *Schoenoplectus robustus* (Salt Marsh Bulrush), etc., and were mainly growing around areas of open water. Moving inland from the Ortega River, a transition is seen from a forested wetland to a scrub/shrub cover type with *Baccharis halimifolia* (saltbush), *Myrica cerifera* (wax myrtle) and other typical species occurs (Figure 3).

Figure 2. Ortega River at Timuquana Blvd. Echinochloa sp. was the dominant species within the marsh nearest the Ortega River. Spartina bakeri occupied areas along creeks and open water where salinity concentrations were likely to be higher.

Figure 3. Ortega River at Fowler Regional Park Observation Tower. The area located further inland from the Ortega River supports a very sparse canopy with numerous snags. Competition between oligohaline and other salt tolerant/freshwater species is seen in these areas.

Transitional wetlands further upstream along the Ortega River exhibit less visible salinity effects, but still display a stressed canopy except for Cypress. Ground cover is composed of salt-tolerant species such as *Cladium jamaicense* (Sawgrass). Invasion of Sand Cordgrass is occurring in areas that are more open and exposed to tidal flows. Another area within

Jacksonville that demonstrates the effects of increasing salinities and conversion to a transitional system is the wetland system at Goodby's Creek. This area displays a mixture of saltwater and freshwater vegetation, with invasion of *Spartina bakeri* occurring in the lower tidal portions of the site (Figure 4). It should be noted that observations of salinity stress to fresh water and/or brackish water wetlands and conversion to salt marsh in the without project condition are not unique to the LSJR. Numerous studies document such effects simply due to sea level rise (Williams, Chow, Song, 2012).

Figure 4. Ortega River at Fowler Regional Park. Clockwise from bottom left: Wetlands seen from creek along Ortega River where Cladium jamaicense is dominant with Fraxinus and Acer rubrum alongside; Tidal marks can be clearly seen along tree on shoreline; Wetlands along portion of creek; Groundcover in central portion of wetlands.

2.2.3 *Tidal Swamp*

Tidal swamp areas are those that have <12% frequency of equal to or greater than 1 ppt high tide salinity. These areas are generally unaffected by salinities and, within the project area, display a healthy plant community structure and soil profile. Tree growth is typical for these areas and natural recruitment is typically strong. Habitat utilization is high for freshwater species such as *Micropterus salmoides* (largemouth bass).

Wetlands south of the Shands Bridge along the St. Johns River are an excellent example of tidal, freshwater swamp (Figure 5). The canopy is dominated by *Taxodium distichum*, *Ulmus Americana*, *Acer rubrum* and other typical tree species. Groundcover is extensive and dominated by *Sagittaria sp*. (Arrowhead), *Pontederia cordata* (Pickerelweed), *Osmunda regalis* (Royal Fern) and other common species. Soils are usually well developed with high organic content.

Figure 5. St. Johns River main stem floodplain with associated emergent vegetation (left); Bald Cypress dominated shoreline and floodplain along St. Johns River main stem (right).

2.3 Interpretation of Wetland Modeling Results

As stated previously, relative to the 2018 No-Action simulation, the 2068 No-Action model run shows upstream salinity migration due to SLR and PWW (Figure 6). None of the 2068 project alternatives moved the wetland transition location upstream relative to the 2068 No Action location (Taylor 2013) due to the greater magnitude of SLR and PWW effects in comparison to project effects. This occurred despite utilization of the three driest years of the model evaluation period. Therefore, the evaluation of project effects was based on the shift in wetland transition location indicated by the 2018 conditions model simulations (Figure 7), which do not include SLR or PWW.

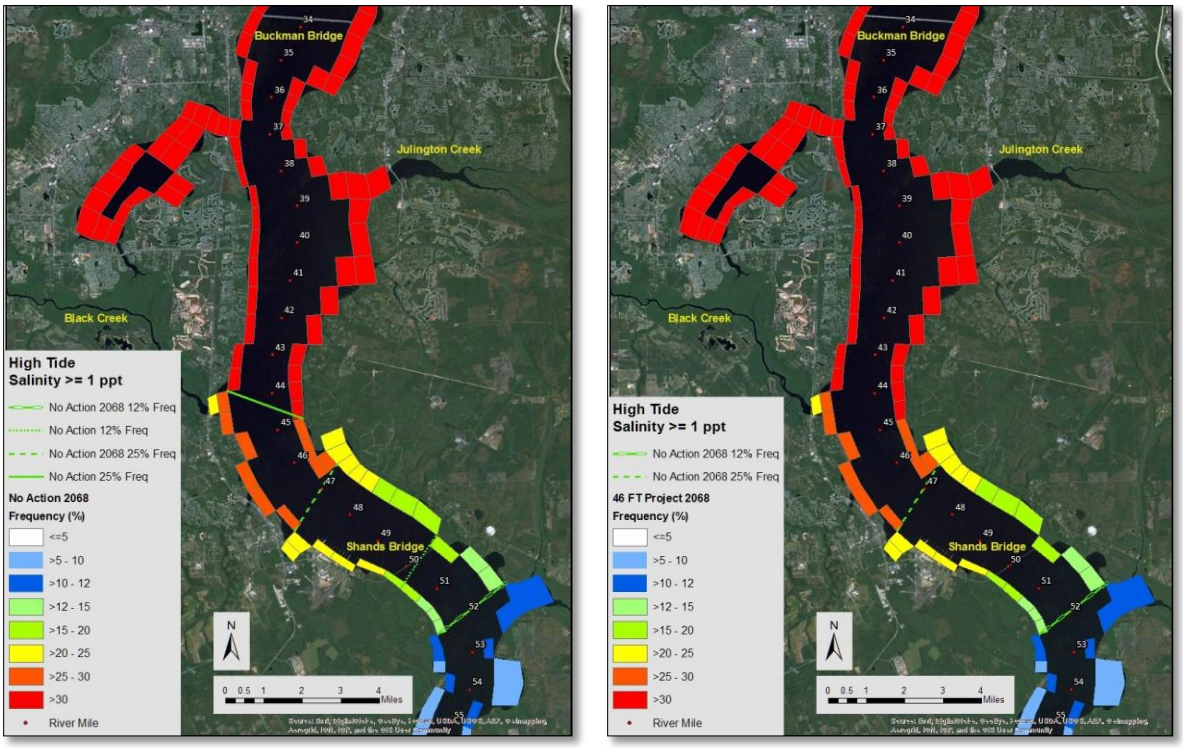

Figure 6. 2068 No-Action (left) vs. 2068 46-ft Alternative (right)

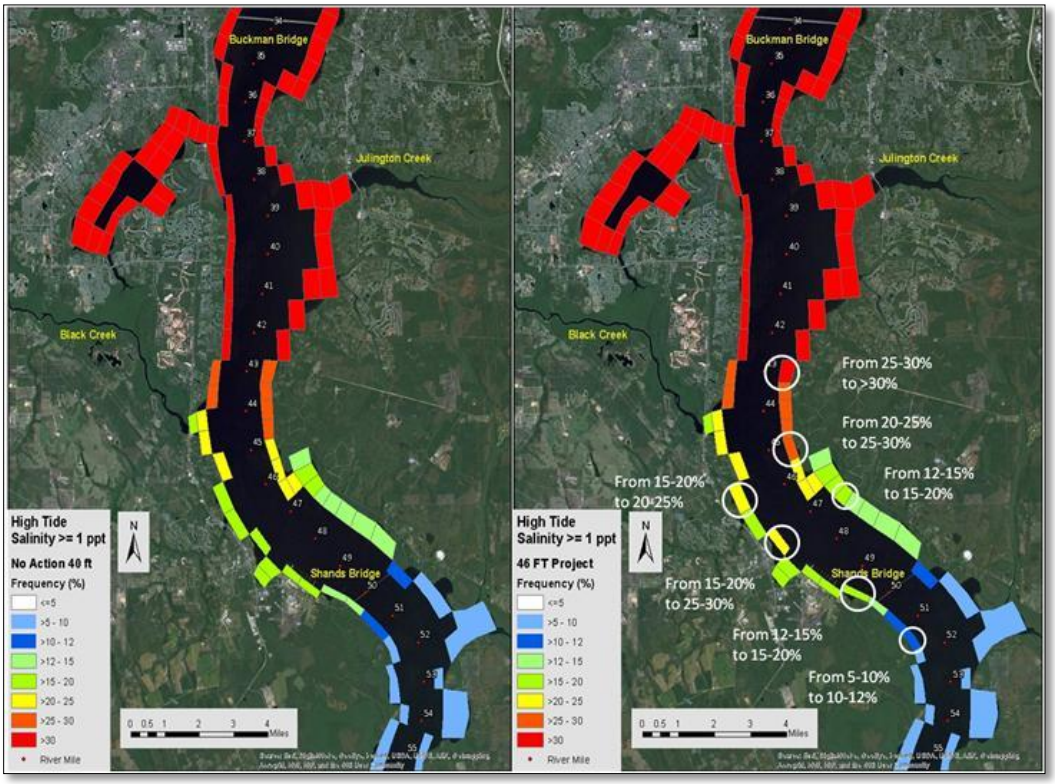

Figure 7. 2018 No-Action (left) vs. 2018 46-ft Alternative (right)

2.4 Functional Assessment Tool

2.4.1 *UMAM Assessment Rationale*

The functional assessment tool utilized for the effects and mitigation assessment is the UMAM. The UMAM is a fairly effective tool for evaluating wetland effects under typical Regulatory situations, where an area would go from varying states of a functional wetland to a non-wetland or partially-functional wetland. Under this scenario, scores typically go from an optimal or moderate level to minimal or not present. However, the UMAM tool has limitations for evaluating salinity effects on wetlands, which in this case would cause wetland conversion rather than complete or partial loss of function. With wetland conversion, the area may go from a fully functional freshwater wetland to a fully functional salt marsh wetland, which is difficult to score because there is not a tremendous loss of wetland value, but a shift to a different ecological type. There would be changes that need to be accounted for such as loss of freshwater habitat utilization, which was a substantial project concern. But, the UMAM is not designed to evaluate a project at this level of specificity. For instance, if evaluating habitat utilization by animal species with specific hydrological requirements in a UMAM, a freshwater wetland that is converted to a salt marsh wetland would still be highly utilized, albeit by "different" species than before the conversion. The limitations of the UMAM were discussed by the Assessment Team, and final UMAM scores represent an understanding that while wetland conversion will cause an effect and needs to be quantified, it would not cause a complete loss of function in the system being evaluated.

2.4.2 *Extent of Project Effects*

There is a great deal of uncertainty in estimating the actual spatial extent of effects, not only how far upstream effects would occur, but also how far into the tidal wetland areas. Although the hydrologic model could predict migration of the saltwater wedge upstream in the St. Johns River, the model was not able to predict how far inland the salinity effects would progress. In order to determine the inland extent of project effects from open water into the adjacent wetlands through tidal influence or sporadic flooding, site visits were conducted to observe the actual vegetative changes in ground cover species that corresponds to the influence of high tides. Another factor used to determine the inland effects was observation of the protrusion of tidal creek systems into the lower and upper wetland areas. In general, conclusions were drawn in the field from these indicators and then the appropriate polygons were delineated utilizing aerial and color infrared images in GIS.

2.5 Wetland Effect Assessment

The wetland effect assessment included the main stem of the LSJR and its 8 major tributaries in the area of effect: Dunn Creek, Broward River, Trout River, Pottsburg Creek,

Ortega River, Julington Creek, Durbin Creek, and Black Creek. Additionally, an assessment of minor tributaries was conducted. Site visits were conducted to each of these areas to characterize the site, quantify affected areas, and record pertinent data. The following sections detail the assessment rationale for each particular area, UMAM scores and estimates of functional loss due to potential salinity increases.

Note: State Regulatory agencies require a comparison of the current conditions to those that would result from the project as a result of implementation. The 2018 model runs that were utilized to predict project effects would be identical to an existing conditions model run if it were conducted. An existing conditions run would utilize the same 6-year model simulation period, and would not include SLR or PWW, which is identical to the 2018 model runs.

2.5.1 *Lower St. Johns River Main Stem*

The 2018 No-Action map was utilized to perform a UMAM assessment of the LSJR main stem. As demonstrated in Figure 8, the tidal marsh area extends to approximately River Mile 44, just north of the mouth of Black Creek. The transitional zone extends to River Mile 50, just at the Shands Bridge. The tidal swamp area is located south of the Shands Bridge.

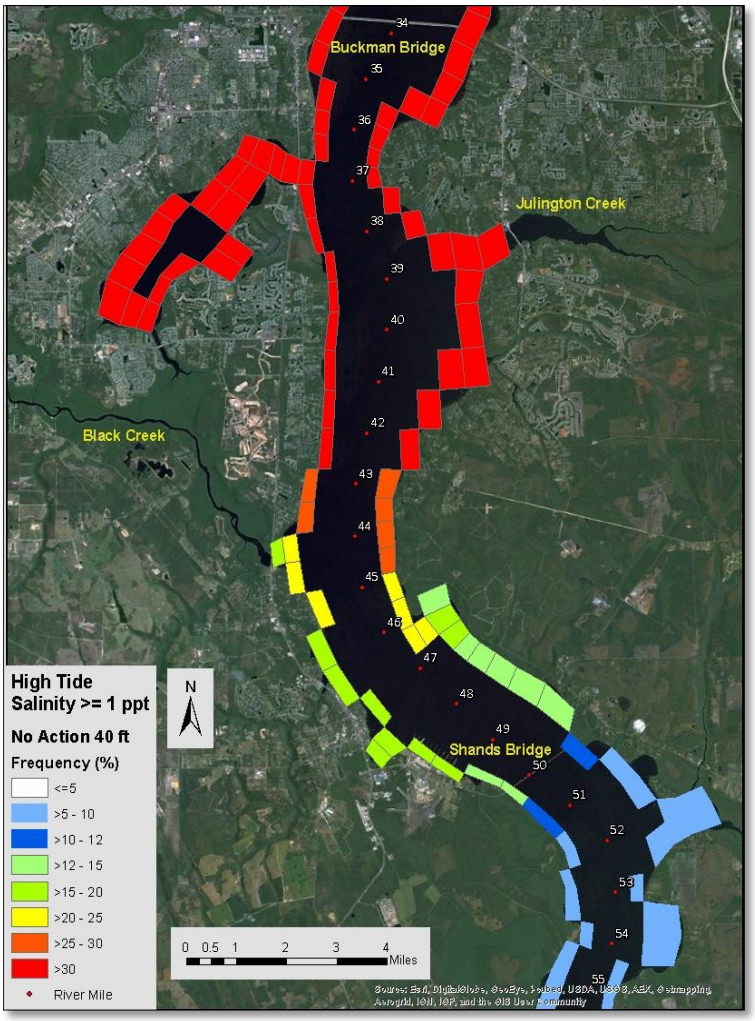

Figure 8. 2018-No Action

Based on the 2018 46-ft Alternative model run (Figure 9) the majority of high tide salinity frequency increases of 1 ppt would occur within the transitional zone. Only one cell occurring within the transitional zone was predicted to be converted into the tidal marsh zone; that is, most effects were of a small enough magnitude that frequencies did not cause these areas to rise above 25%. Rather than rate each individual model cell that noted change, the assessment team rated the entire transitional zone, based on the determination that when incorporating model uncertainty there would likely be an average change across the entire transitional zone that would fluctuate in certain areas based on tidal ranges, seasonality and other factors. It was estimated that frequencies would rise within the transitional zone on an average of 2-3% as noted by the scale in Figure 8. The specific effects due to the proposed project were rated in the UMAM as a potential reduction in downstream benefits, increases in soil subsidence and transition of plant communities.

With the project in place, it is expected that habitat utilization of the forested wetlands will be reduced for freshwater species, and although there may be increased utilization by estuarine species, a loss was indicated as a result of the project. Certain fish and invertebrates may be driven slightly upstream by the increases salinity frequencies. Additionally, any tree mortality could reduce nesting areas for birds and habitat for reptiles and amphibians. Soil subsidence would likely occur within areas nearest the shoreline that receive a higher frequency of inundation. As elevations decrease, a corresponding change in vegetation would occur with plants adapted to both longer hydroperiods and higher salinity frequencies. Transitioning plant communities would be most visibly noted among those tree species that are more salt intolerant. Stunting of trees would increase nearest the edge of the river, with those more inland being less affected. Some mortality of tree species would also be anticipated, particular in those areas where soil subsidence destabilizes the substrate. Bald Cypress would likely become the dominant canopy species, although some growth may be inhibited. In addition, changes in ground cover would be observed, particularly in those areas directly along the river. Areas further inland would experience colonization by more salt tolerant species, with a graduated stratification towards more salt intolerant species as distance inland increases.

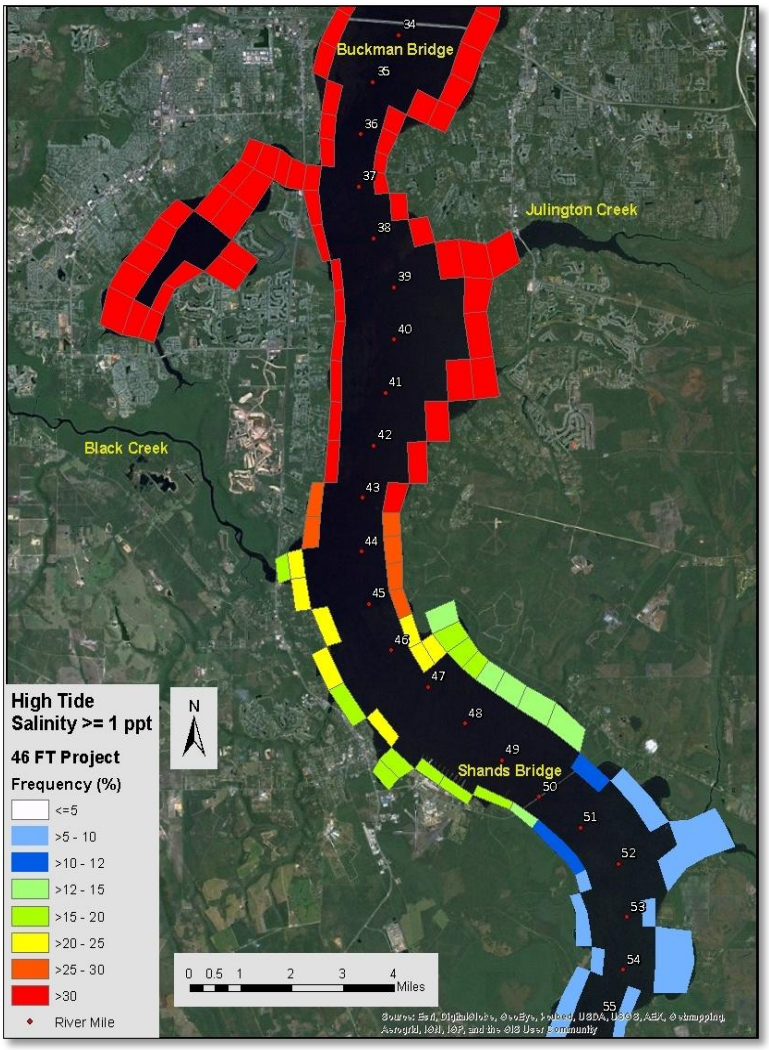

Figure 9. 2017-46ft

For the assessment, an overall UMAM score was applied to all of the wetland areas within this reach of the LSJR, and the sum of the acreage was utilized to calculate a functional loss of 17.3 units within this area (Table 1). There were no major differences in wetland function or location that warranted separate polygons or assessments for each particular wetland that was identified. For affected acreage, emergent wetland areas greater than approximately 0.20 acres and all forested wetland areas were quantified (to the inland extent of estimated effect). A total of 86.51 acres of forested and emergent wetlands would be affected. The emergent wetland effects would be slightly different than those experienced by the forested wetlands. The emergent areas are all mainly dominated by one species, typically cattails or bulrush, and could likely experience a partial to complete shift in vegetation. In regards to the UMAM assessment, these areas were rated similarly, with at least some loss of freshwater utilization by fish and invertebrates likely occurring with a shift towards more estuarine utilization.

Table 1. St. Johns River Main Stem Wetland UMAM Results

St. Johns River Mainstem Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss [3]
Freshwater Tidal Floodplain	0.76	0.56	0.2	86.51	17.3
TOTAL					17.3

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2 *St. Johns River Tributaries*

2.5.2.1 *Tidal Ranges and other observations*

Although tidal ranges decrease with distance traveled upstream, effects within tributaries are difficult to pinpoint as differences in tributary length, surrounding land elevation, and effects to wetland resources can greatly increase or reduce the extent of the affected areas. A conservative approach was taken, both with the simulation periods as described in the Modeling Section of the Report, and also with the wetland effects assessment. Where the extent of effects was uncertain, the wetland effects assessment utilized the larger scenario to ensure that all possible effects would be quantified.

As demonstrated in Table 2 below, there is a large variation of tidal range within the affected area, from over 3.5 feet near the mouth of the St. Johns River to barely 0.5 feet towards the Shands Bridge.

Table 2. Tidal Station Locations and Ranges, noaa.gov, 14 October 2009

Waterway	Mean Range (ft)	Spring Range (ft)	Mean Tide Level (ft)
Clapboard Creek	3.64	3.94	1.94
Broward River	2.99	3.47	1.58
Trout River (Moncrief Creek Entrance)	2.51	2.91	1.34
Little Pottsburg Creek	2.02	2.34	1.09
Ortega River Entrance	1.11	1.26	0.63
I-295 Bridge (West End)	0.91	1.06	0.55
Doctors Lake	0.80	0.93	0.45

2.5.2.2 *UMAM Assessment Rationale*

In order to evaluate tributaries, site visits were conducted to identify the extent of tidal effects within tributaries, characterize the type and extent of wetland systems, and assess parameters such as wildlife utilization and water quality. The tributaries that were assessed were the Ortega River, Trout River, Pottsburg Creek, Cedar Creek, Dunn Creek, Julington Creek, Durbin Creek, and Black Creek.

Based on the modeling results and site visits that were conducted for the St. Johns River main stem, minor tributaries located north of Black Creek are likely to be completely within the tidal marsh zone. These smaller tributaries are not long enough to lose salt

water influence upstream and do not drain a large enough area to receive substantial inputs of freshwater. Therefore, minor tributaries were not thought to benefit from this assessment. Additionally, not all areas located along major tributaries were assessed; only those portions that were far enough removed from the LSJR and drained a large enough area to receive substantial freshwater inputs, such as the two forks of Cedar Creek.

2.5.2.3 *Assessment Scores*

2.5.2.3.1 *Ortega River*

The Ortega River floodplain wetland system is one of the most extensive within the LSJR. The current transitional area within the Ortega River is perhaps the most representative among all major tributaries of the LSJR, with numerous indicators of saltwater effects such as stunting and mortality of trees, invasion by salt tolerant vegetation, etc. Table 3 gives UMAM scores for Ortega River assessment area.

Table 3. Ortega River Wetland UMAM Results

Ortega River Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss [3]
Freshwater Wetlands	0.83	0.66	0.17	73.74	12.54
TOTAL	--	--	--		12.54

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.2 *Trout River*

The Trout River system has been highly altered by development as it is within a highly urbanized and industrial corridor. The area that was identified and scored is likely already being heavily influenced by higher salinity frequencies; however, due to a lack of modeling data within this area, it was still evaluated and scored to determine effects. Table 4 gives UMAM scores for Trout River assessment area.

Table 4. Trout River Wetland UMAM Results

Trout River Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss [3]
Freshwater Tidal Floodplain	0.70	0.56	0.14	21.90	3.07
TOTAL					3.07

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.3 *Pottsburg Creek*

Pottsburg Creek is located within a highly urbanized, residential section of Jacksonville. The tidal swamp portion of this tributary has been dredged in some areas likely due to local drainage capacity requirements. Some exotic species are present and there are indications of hydrologic disturbance throughout this system such as exposed roots, disturbed ground cover and exotic vegetation. Table 5 gives UMAM scores for the Pottsburg Creek assessment area.

Table 5. Pottsburg Creek Wetland UMAM Results

Pottsburg Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss[3]
Freshwater Wetlands	0.73	0.63	0.10	11.27	1.13
TOTAL					

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.4 *Cedar Creek*

The most upstream wetlands along Cedar Creek that still exhibit freshwater vegetation are likely exposed to higher levels of salinity and are likely already within a transitional zone based on the close proximity to downstream salt marsh. The wetlands do still exhibit an excellent hydrologic regime, but do suffer some from the proximity of downstream development and water quality. Table 6 gives UMAM scores for the Cedar Creek assessment area.

Table 6. Cedar Creek Wetland UMAM Results

Cedar Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss[3]
Freshwater Tidal Floodplain	0.77	0.70	0.07	16.77	1.17
TOTAL					

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.5 *Dunn Creek*

The Dunn Creek system transitions from a salt marsh near the mouth to an transitional area with salt marsh along the shoreline and freshwater wetlands landward along the upland edge, and then to a freshwater wetland. Based on the higher level of salinity that occurs in these areas and proximity to the mouth of the St. Johns, it was determined that the salt marsh and transitional area have already been affected to the maximum extent possible. Therefore, the upstream freshwater wetland areas that were devoid of salt marsh vegetation were evaluated as areas that could be potentially affected by increasing levels of salinity. The remaining freshwater areas tended to be small and lacked a floodplain within

areas upstream of those systems, but were deemed to be high quality systems. Table 7 gives UMAM scores for the Dunn Creek assessment area.

Table 7. Dunn Creek Wetland UMAM Results

Dunn Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss[3]
Freshwater Tidal Floodplain	0.86	0.76	0.10	4.07	0.41
TOTAL					0.41

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.6 *Julington and Durbin Creeks*

LSJR main stem modeling indicated that the mouth and westernmost portion of Julington and Durbin Creeks fall within the tidal marsh zone. Changes in vegetation resulting from increased levels of salinity were estimated to begin a considerable distance upstream within Julington and Durbin Creeks. Site visits indicated that tidal influence extended far into these creek systems and effects were assessed for a fairly substantial distance upstream to where tidal influence substantially decreases based on water marks on trees. Table 8 gives UMAM scores for the Julington and Durbin Creeks assessment area.

Table 8. Julington Creek Wetland UMAM Results

Julington Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss[3]
Freshwater Swamp	0.86	0.70	0.16	108.48	17.36
Durbin Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss[3]
Freshwater Swamp	0.86	0.70	0.16	62.27	9.96
TOTAL					27.32

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.2.3.7 *Black Creek*

Modeling predicted that the transitional zone begins near the Black Creek confluence with the LSJR. Although the model did not indicate effects occurring at the mouth of the creek, the effects assessment used a conservative approach similar to that used along the LSJR main stem. Using a distance similar to that of LSJR main stem effects, salinity effects were estimated to occur approximately 5 miles into the Black Creek system to the Railway Bridge. Effects were extended 125 feet into the floodplain area and quantified. Table 9 gives UMAM scores for the Black Creek assessment area.

Table 9. Black Creek Wetland UMAM Results

Black Creek Wetland UMAM Results					
Wetland Type	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss [3]
Freshwater Tidal Floodplain	0.86	0.70	0.16	150.45	24.07
TOTAL					24.07

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

2.5.3 *Summary of UMAM Scoring for LSJR Mainstem and Tributaries*

Overall, the proposed project could potentially produce a functional loss of 87.01units for wetlands in the tributaries and main stem (see attached UMAM worksheets).

Table 10. Summary of UMAM Scoring Results

Wetland Area	Baseline[1]	With Project[2]	Delta	Effected Acreage	Functional Loss [3]
Mainstem	0.76	0.56	0.20	86.51	17.30
Ortega River	0.83	0.66	0.17	73.74	12.54
Trout River	0.70	0.56	0.14	21.90	3.07
Pottsburg Creek	0.73	0.63	0.10	11.27	1.13
Cedar Creek	0.77	0.70	0.07	16.77	1.17
Dunn Creek	0.86	0.76	0.10	4.07	0.41
Julington Creek	0.86	0.70	0.16	108.48	17.36
Durbin Creek	0.86	0.70	0.16	62.27	9.96
Black Creek	0.86	0.70	0.16	150.45	24.07
Total					87.01

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

The main wetland effects would occur within the extensive tidal floodplain areas of the tributaries including the Ortega River, Julington Creek, Durbin Creek and Black Creek. These systems are already experiencing the effects of salinity increases; however, these effects would be slightly increased as a result of the project. Under the modeling scenarios, utilizing the conservative (drought condition) period of record, these riverine tributaries would experience an estimated 1ppt salinity increase over 2-3% frequency. This information is an interpretation of modeling performed in the main stem of the river; however, modeling information from the tributaries is expected to confirm these findings. These wetlands will not be eliminated, but will experience increased conversion towards more salt tolerant systems. As stated above, some habitat utilization could shift to favor estuarine species, but is still expected to remain high.

Tributaries downstream of downtown Jacksonville already experience high salinities, and most of the associated wetlands within the tidal areas are comprised of salt marsh, although headwaters of these tributaries may have other wetland systems. The transition zone from saline to fresh water in these tributaries is generally short in length thus limiting the area of potential project salinity effects. Additionally, the wetland systems associated within urban tributaries generally experience heightened levels of stress due to a number of factors including habitat alteration, surrounding land use, etc. As a result, the loss of freshwater function within those systems upstream of downtown Jacksonville would be less when compared to those associated with, for example, Black Creek or Durbin Creek.

As predicted by the modeling, project effects would occur to the tidal wetlands located in the transitional zone along the St. Johns River main stem from Mile 44 to 50. These areas, already being affected by rising salinities within the river, would likely experience an acceleration of salinity effects as described in the sections above. The shoreline of the St. Johns River within this reach has areas of highly developed residential communities as well as some undeveloped areas along the eastern shoreline.

3 Submerged Aquatic Vegetation

3.1 SAV in the Lower St. Johns River

SAV is an important component of the aquatic ecosystem. It anchors sediments and creates substrate for epifauna and epiphyton, provides dissolved oxygen, offers wildlife refuge and food resources, and helps balance nutrients and phytoplankton populations. The LSJR SAV community contains 12 documented species (Figure 10). *Vallisneria americana* was the species used in the SJRWMD SAV model that was refined for the Jacksonville Harbor deepening project. *V. americana* was selected to be the representative SAV as it is the dominant species in the estuarine reach of the river and its physiology and ecology are well studied. It is an important pioneer species as other endemic species are almost never found when *V. americana* is absent (SJRWMD 2012).

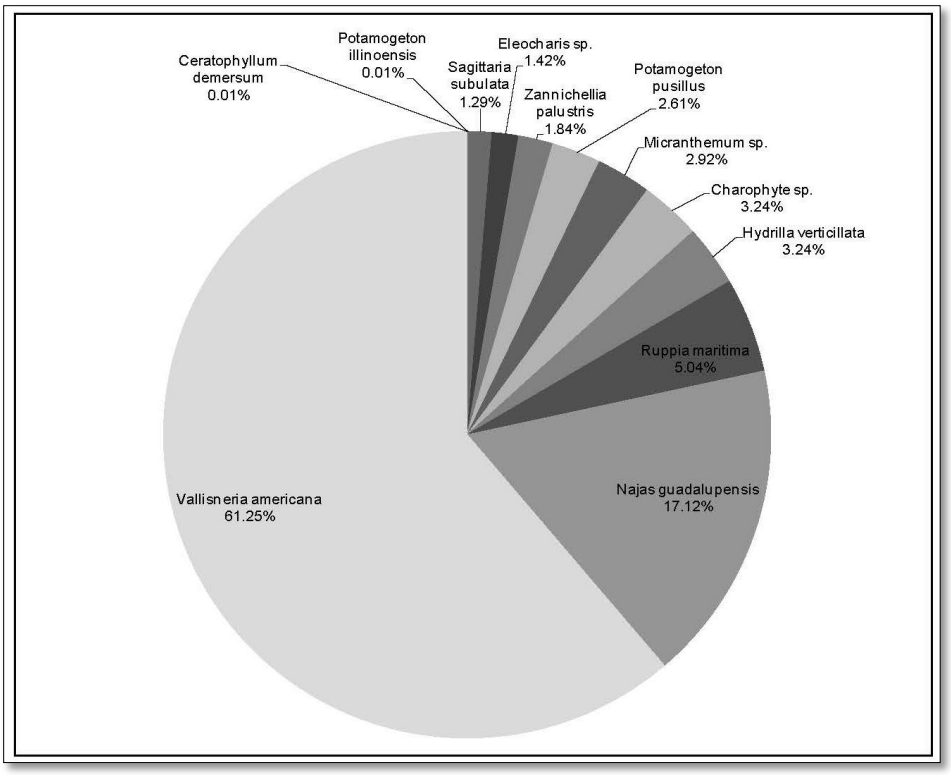

Figure 10. Relative abundance of SAV species in the Lower St. Johns River (SJRWMD 2012)

SAV is a key ecological community in the LSJR that occurs commonly along the shoreline from approximately River Mile 25 (the Fuller Warren Bridge) and upstream. SAV is sparsely distributed in the lower end of its range and its distribution varies from year to year. SAV become more abundant and dense upstream, with stressed yet persistent beds occurring at approximately River Mile 31 (Naval Air Station-Jacksonville [NAS-JAX]). This likely represents the most downstream extent of persistent SAV beds in the LSJR. SJRWMD monitoring shows that SAV from River Mile 31 upstream to approximately River Mile 37 (Doctors Lake) is subject to periodic salinity stress which affects both distribution and abundance. SAV in this area are also subject to low-light stress during high runoff conditions (SJRWMD 2012, Taylor 2013).

Both freshwater and euryhaline SAV species colonize the upper reaches of the LSJR estuary. Euryhaline species tolerate a wide range of salinity conditions. The interaction between salinity tolerance and ambient salinity conditions determines the spatial extent of each species. Short-term increases in salinity cause salt-intolerant grass beds to thin out or disappear. *V. americana* is the most abundant SAV within the LSJR and has a broad ranging distribution due to its capacity to grow and reproduce under a wide range of habitat conditions including water of various salinities. Studies have shown that over sustained durations, *V. americana* has maintained growth at a salinity of 4.8 parts-per-thousand (ppt), has ceased growth at a salinity of 8.4 ppt, and experienced complete dieback at a salinity of 18 ppt. These salinities are better tolerated for shorter periods of time as

higher growth occurs at lower salinity concentrations (SJRWMD 2012). Other studies have shown no difference in growth rates between 0 and 3 ppt salinity treatments and eventual mortality at salinities greater than 15 (SJRWMD 2012). The second most abundant SAV in the assessment area, *Najas guadalupensis* (Southern Naiad), occurs at a relative abundance of about 17% in the LSJR. This SAV is a less salinity tolerant species with restricted brackish water occurrence. *N. guadalupensis* grows best in salinities less than 3 ppt with decreasing growth up to a salinity of 10 ppt. Exposures above 10 ppt for greater than 4 weeks result in mortalities (SJRWMD 2012). The third most abundant SAV in the assessment area is *Ruppia maritima* (widgeongrass). *R. maritima* tolerates a wider range of salinity than other species of freshwater SAV. A number of studies have documented *R. maritima* flowering in water salinities from 1.8 – 28 ppt. *R. maritima* has been found to tolerate very high salinities exceeding full seawater strength. Generally, *R. maritima* is tolerant of very high salinities, exceeding full seawater strength, and will generally not be affected by high salinity water. It is responsive to salinity changes and its abundance can actually increase in low salinity regions with slight increases within the 5-15 ppt salinity range. It is proposed that *R. maritima* may act to replace *V. americana* if the latter plant were reduced in coverage by salinity increases (SJRWMD 2012).

3.2 SAV UMAM Assessment Zones

3.2.1 *Existing SAV Abundance and SAV Mapping*

The SJRWMD has monitored and recorded presence of SAV in the LSJR Basin. The 2009 publication, *Distribution of Submerged Aquatic Vegetation in the Lower St. Johns River: 2006 Atlas* (SJRWMD 2009) maps SAV in the LSJR using 2006 data. The resulting map was presented as a continuing series of atlases documenting the distribution and change of SAV in the LSJR, shown in Figure 11. This SAV distribution was used in part to define UMAM assessment zones and estimate abundance of SAV within each assessment zone.

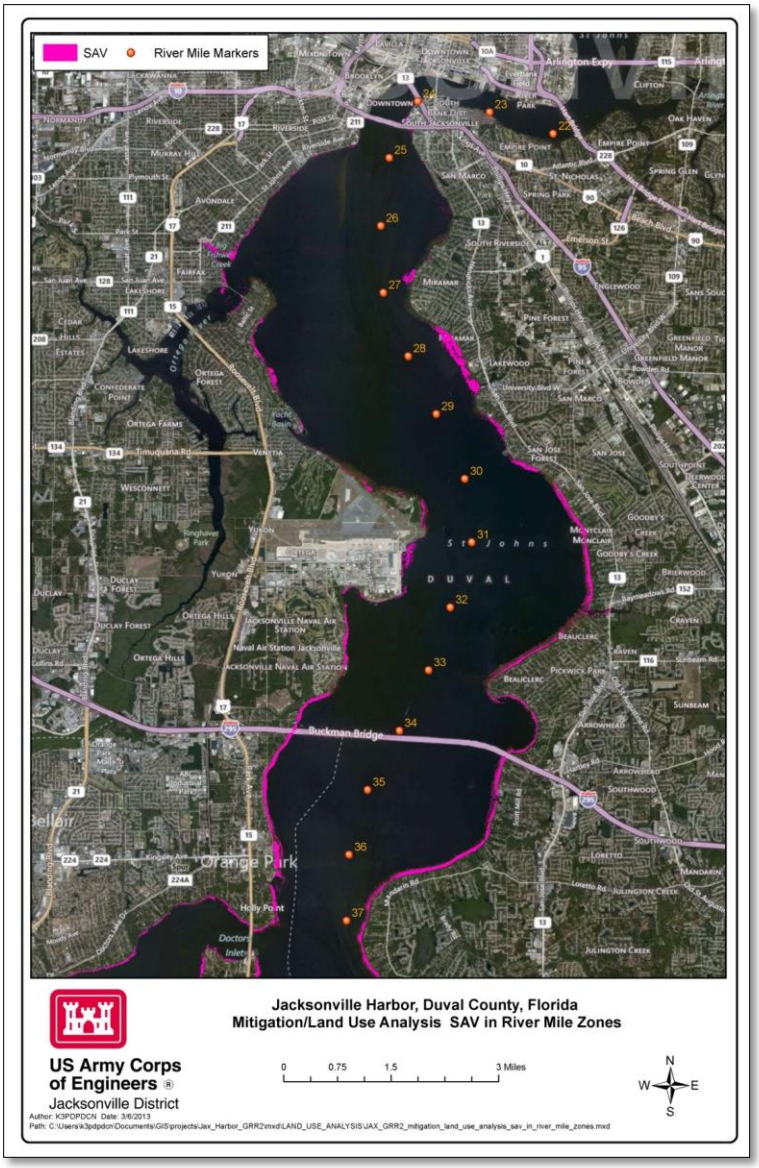

Figure 11. Submerged aquatic vegetation mapping via hyperspectral imagery (SJRWMD 2009)

3.2.2 *SAV Ecological Model Baseline Conditions*

The SJRWMD ecological SAV model for the LSJR WSIS, that was used to evaluate the potential effects of water withdrawal on SAV communities, was reviewed for applicability to the Jacksonville Harbor project. The SJRWMD SAV model was determined to be appropriate and was subsequently revised to evaluate salinity effects due to the Jacksonville Harbor deepening project on the LSJR. Revision to this model include the conservative period of record, use of the 1995 land use data, and updated bathymetry.

As the dominant SAV, *V. americana* was used in the ecological model to represent salinity effects to SAV. The model littoral cells (Figure 12) represent the shallow shoreline habitat

where *V. americana* may grow in this area. These cells were used in the model to simulate differing salinity conditions on *V. americana.* However, the uniform area depicted by the model cells does not capture the actual areas of SAV growth and abundance in the varying conditions along the length of the river. Therefore, SAV mapping performed by the SJRWMD was used as a tool in this evaluation to more accurately estimate SAV acreage in the assessment areas as described below.

Initial review of EFDC simulation results indicated that the salinity change effects on SAV due to the harbor deepening would not reach Green Cove Springs (River Mile 48). Therefore, the model considered salinity effects only from the downstream extent of *V. americana* at River Mile 24.5 to River Mile 48 (approximately the Fuller Warren Bridge to Green Cove Springs).

Note: As this assessment was specific to SAV, the effect of salinity was different than what was presented in the wetland model.

Each model cell was assigned a "daily stress condition" (Figure 13) as defined in the SJRWMD WSIS from four stress categories defined in the SAV salinity exposure model. Frequency of salinity stress was calculated from the model output. For each model cell, the stress frequency was calculated as percentage of simulation time the cell was in one of the four stress conditions and magnitude of stress frequency increase as the difference between stress frequency values for different simulation conditions (Taylor 2013).

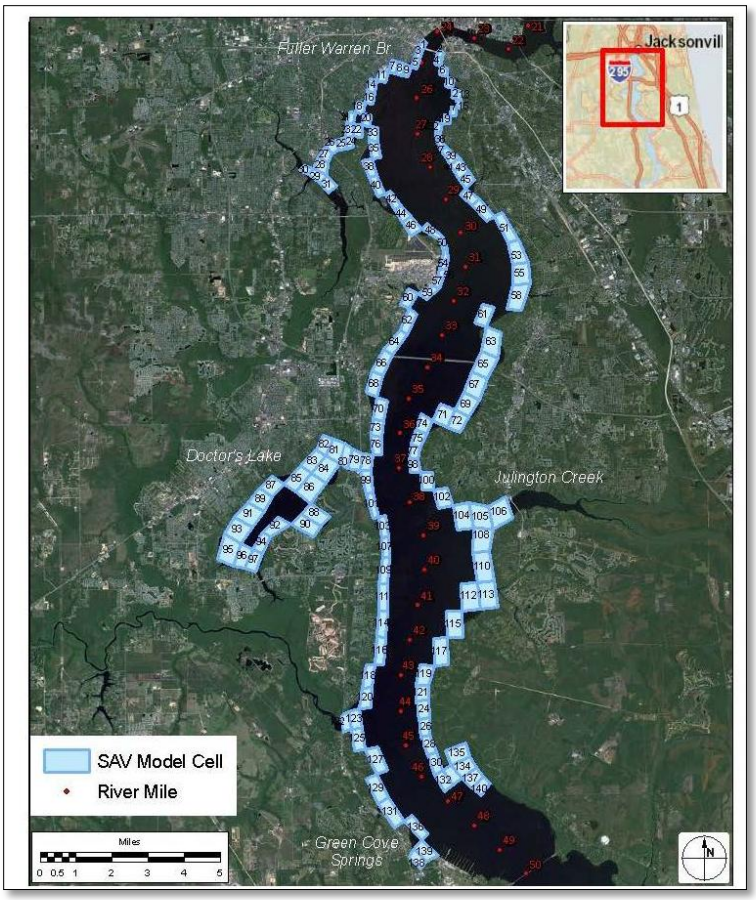

Figure 12. SAV ecological model littoral cells (Taylor 2013)

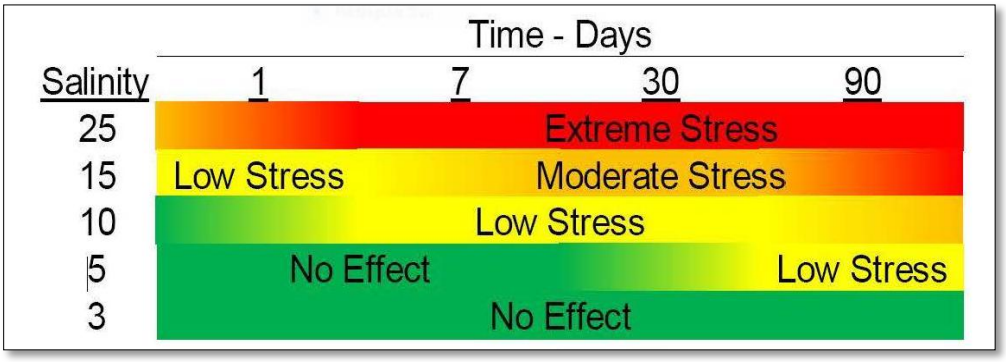

Figure 13. *V. Americana* Daily Stress Conditions based on salinity concentration and duration of exposure. (SJRWMD 2012)

Baseline conditions (for both 2018 and 2068 simulations) included use of the 6-year evaluation period with the existing Jacksonville Harbor channel depth of 40 ft. Initial modeling simulations under 2018-Baseline river conditions showed moderate to extreme SAV stress to *V. americana* from approximately River Mile 24.5 to River Mile 35. Figure 14 shows results where the frequency of stress is given for the 2018-Baseline 40 ft depth

channel conditions. The most downstream cells, those downstream of River Mile 26 are subjected to moderate to extreme salinity stress up to 45% of the time. Approximately two miles upstream, near River Mile 28, stress frequency decreases to 25% or less of the simulation period. Near River Mile 31, the model predicts salinity stress during approximately 10-15% of the simulation period. Moving upstream, stress frequency continues to decrease. Stress frequencies of 1 – 5% occur south of River Mile 32. The model-predicted stress frequency drops to 0% on the west side of the river at River Mile 34. The 0% stress frequency zone begins at about River Mile 35 on the east side of the river.

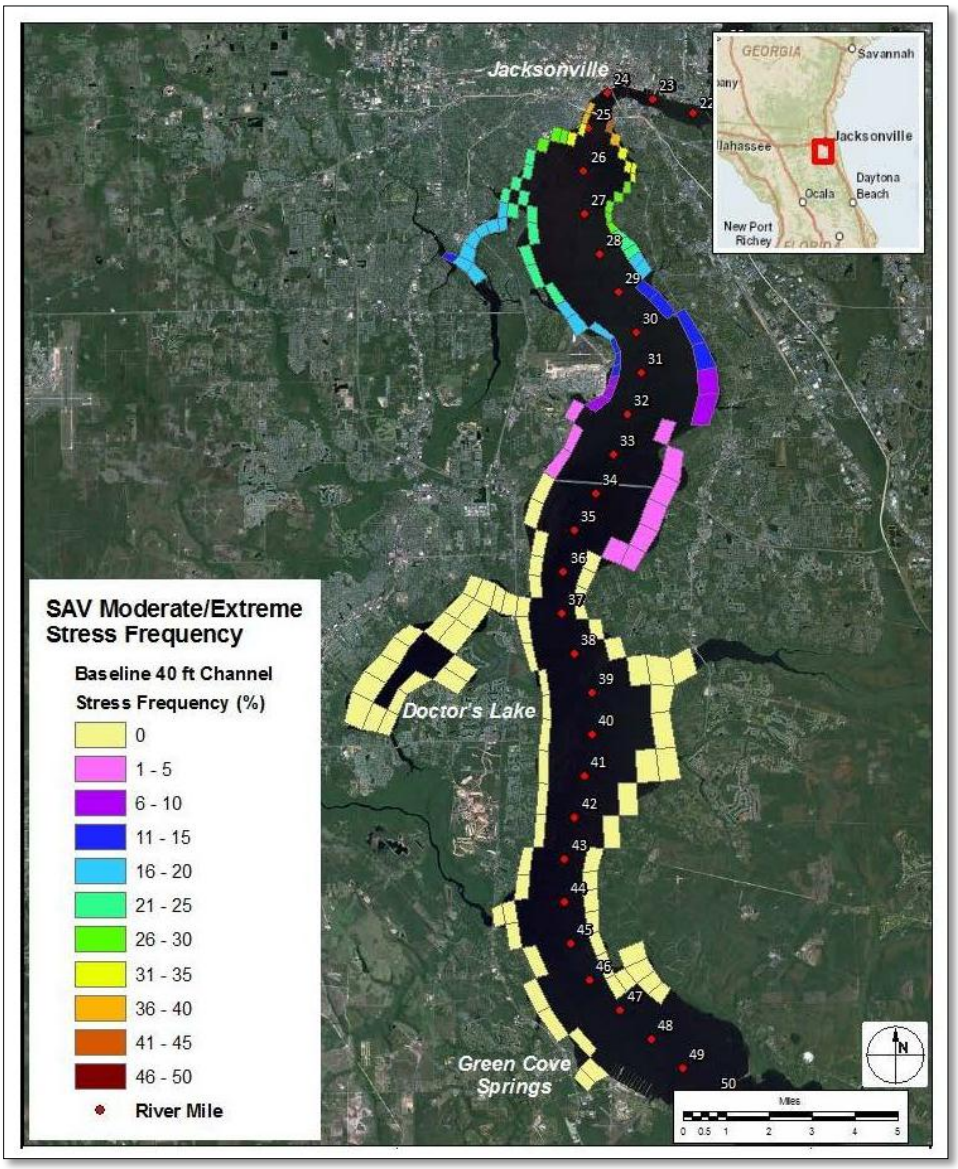

Figure 14. Frequency of moderate to extreme SAV stress for 2018-Baseline conditions.

3.2.3 *UMAM Assessment Zones*

To determine UMAM assessment areas, zones were created for the portion of the LSJR. These assessment zones were based on mapped SAV abundance as seen in Figure 12 and the modeled 2018-Baseline *V. americana* stress conditions, seen in Figure 14. The assessment zones are as follows:

- Zone 1 - River miles 24.5 to 26: Contain sparse, stressed SAV beds. Simulations shows SAV experience moderate to extreme stress 21-45% of the time.

- Zone 2: River miles 26-31 also contains sparse, stressed SAV, experiencing moderate to extreme salinity stress 11-35% of the time.

- Zone 3: River mile 31-35 contains persistent yet stressed SAV beds. The simulation shows SAV experience moderate to extreme stress 0-10% of the time.

- Zone 4: Upstream of river mile 35 contains persistent SAV beds. The simulation shows show SAV experience moderate to extreme stress 0-5% of the time.

A summary of these assessment zones are shown in Table 11

Table 11. SAV UMAM assessment

Assessment Zone	River Mile	SAV Bed Condition	Moderate/Extreme Stress Frequency: 2018-Baseline Conditions	Moderate/Extreme Stress Frequency: 2068-Baseline Conditions	Moderate/Extreme Stress Frequency: 2068-46ft Conditions
1	24.5 – 26	Sparse/Stressed	21-45%	26-45%	26-50%
2	26-31	Sparse/Stressed	11-35%	11-35%	16-40%
3	31-35	Persistent/Stressed	0-10%	1-15%	1-20%
4	35-upstream	Persistent	0-5%	1-5%	1-10%

3.3 Future without Project SAV Effects

The future without project simulates the 2068-Baseline (50 yr-Baseline) condition, including the existing 40 ft channel depth, and consideration of historic sea level rise and future water withdrawal. The results (Figure 15) show the percentage of time each of the littoral cells is under moderate to extreme salinity stress for this condition. The model shows that the most downstream cells in assessment Zone 1 (River Miles 24.5 to 26) exhibit the greatest time under salinity stress with 26-45% frequency for the simulation period. Zone 2 (River Miles 26 to 31) shows salinity stress frequency from 11 to 35%. For Zone 3 (River Mile 31 to 35) the model predicts salinity stress during 1-15% of the simulation

period. Moving upstream of River Mile 35, Zone 4 shows stress frequency decreasing to 1-5% at approximately River Mile 35. The 0% stress frequency zone begins at approximately River Mile 36 (Taylor 2013).

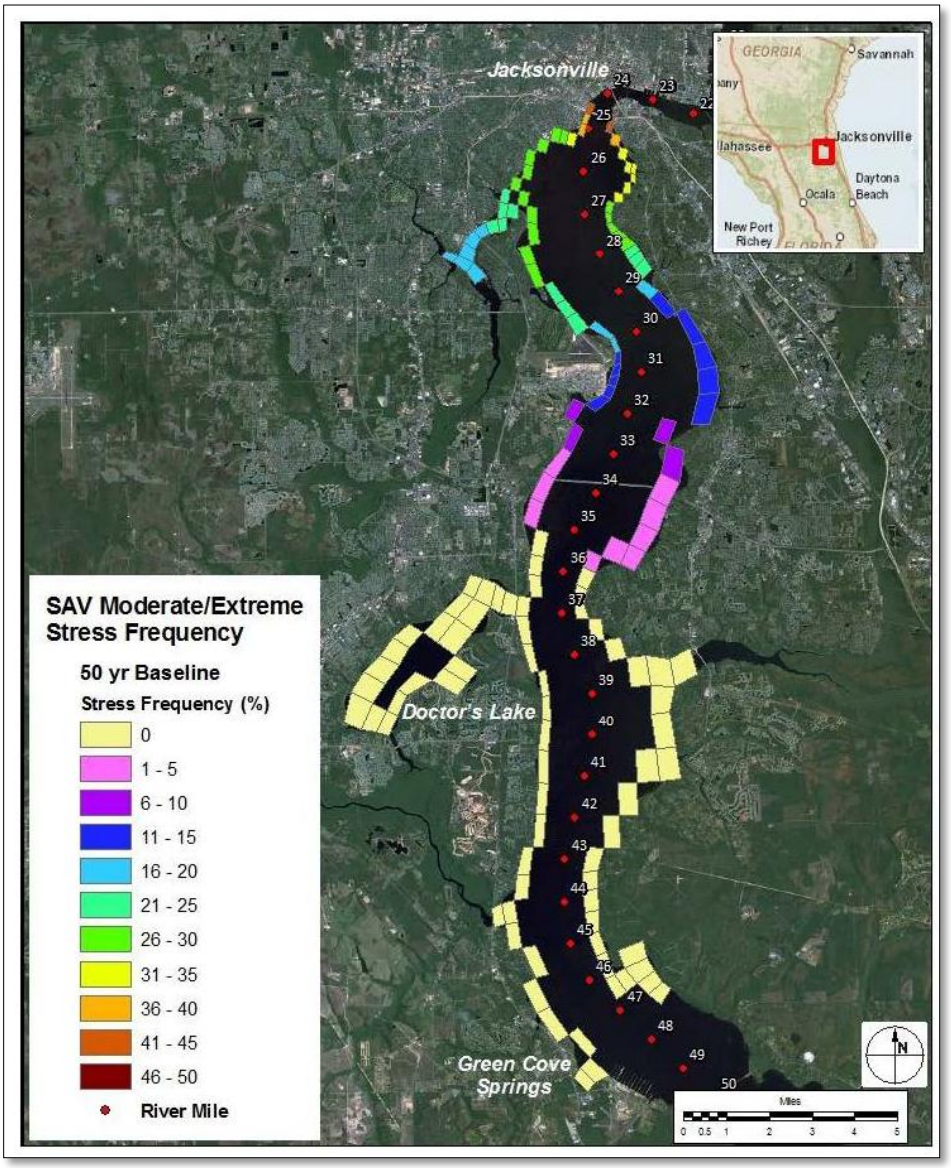

Figure 15. Frequency of moderate to extreme SAV stress for future without project (2068-Baseline) conditions.

3.4 Future with Project

Future with project conditions (2068-46 ft) are considered for the 50-year project period, including proposed project deepening, proposed future water withdrawal, and historic sea level rise, to evaluate effects of the Jacksonville Harbor deepening on *V. americana*.

Figure 16 shows the percentage of time each of the littoral cells is under moderate to extreme stress for the 50-yr 46 ft project conditions. Cells in assessment Zone 1 (River Mile 24.5 to 26) exhibit a 26-50% salinity stress frequency. Zone 2 (River Mile 26-31) shows salinity stress frequency from 16 to 40%. From River Mile 31 to 35, Zone 3, the model predicts salinity stress during about 1-20% of the simulation period. Moving upstream, Zone 4, stress frequency continues to decrease. River Mile 35-37 shows stress frequencies of 1 – 10%. The southern end of the salinity stress zone (0% stress frequency) begins at the Doctors Lake (River Mile 37), about 1 to 2 miles upstream of its location with the 50-yr baseline condition (Taylor 2013).

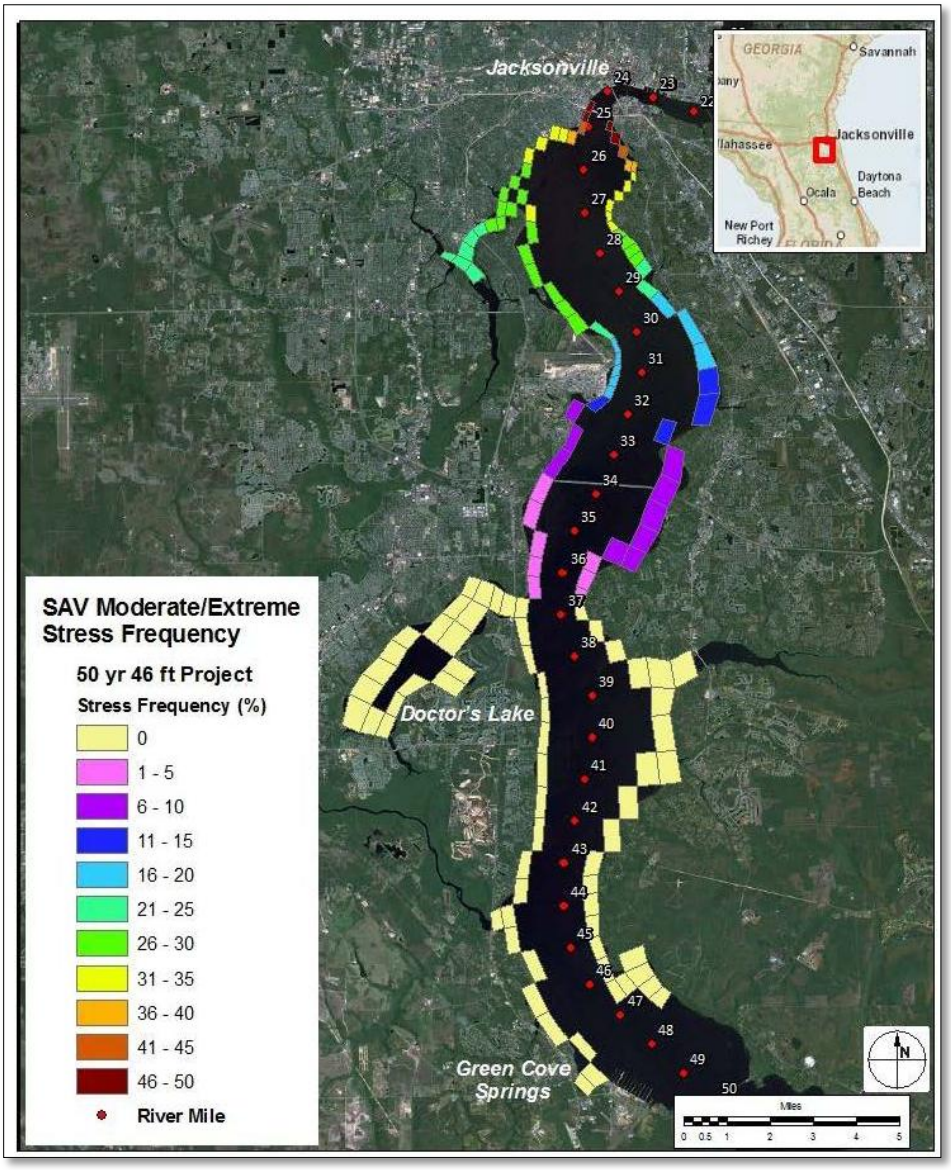

Figure 16. Frequency of moderate to extreme SAV stress for future with project conditions (2068-46 ft).

Figure 17 illustrates the magnitude of salinity stress frequency increase in the future with project relative to the future without project. A stress frequency increase of up to approximately 5-9% is seen between River Mile 24.5 to River Mile 26, in assessment Zone 1. From approximately River Mile 26 to River Mile 37 (Zones 2-4), less than or equal to 5% salinity stress frequency increase is seen in with project conditions (Taylor 2013).

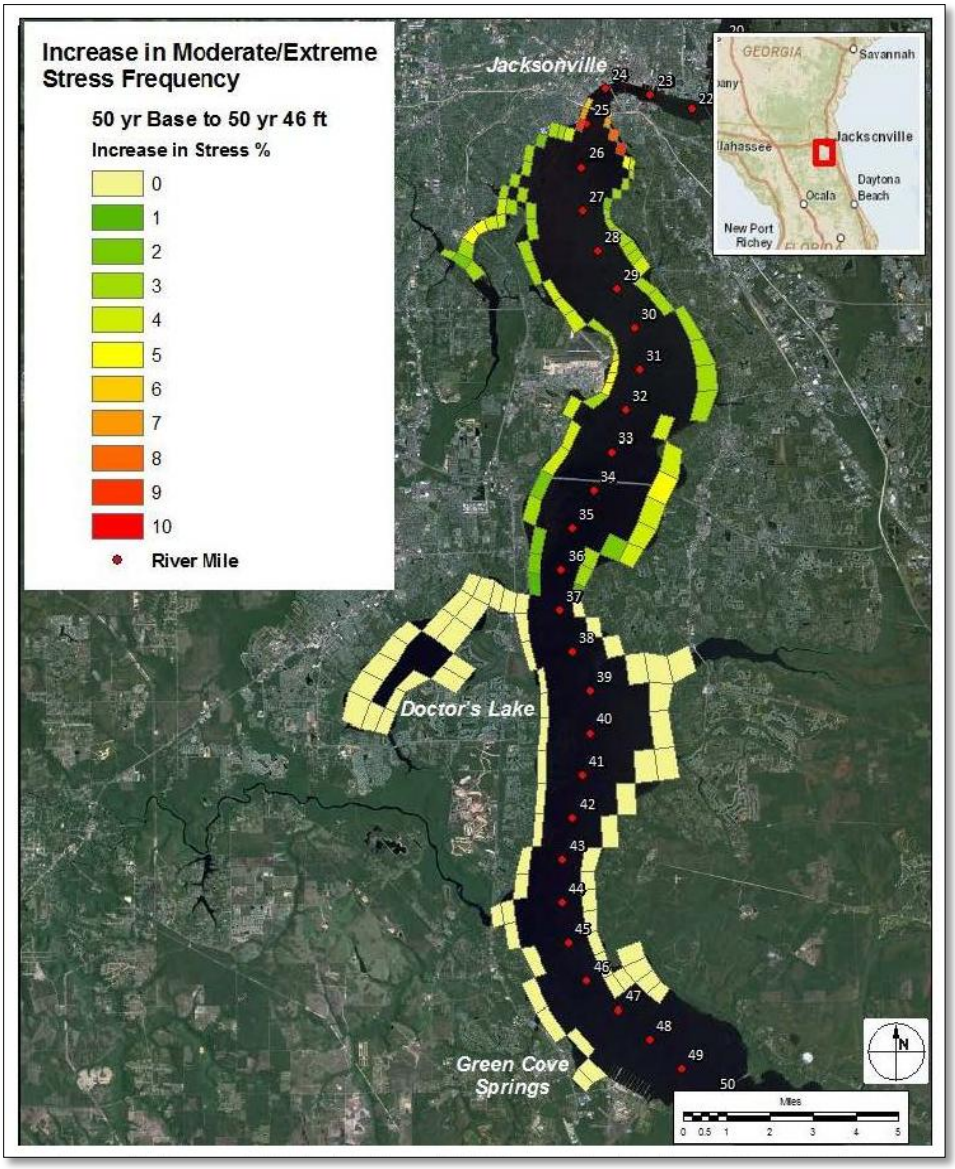

Figure 17. Increase in moderate to extreme SAV stress – future without project (50 yr-baseline) to future with project conditions

3.5 SAV UMAM Effects Assessment

The assessment zones were evaluated for future without project conditions and future with project conditions under UMAM evaluation categories. Mapped SJRWMD polygon data

provided estimated acreage of SAV coverage per assessment area as seen in Figure 18. Estimated acreage of SAV in assessment Zone 4 was calculated between River Mile 35-37. These two miles represent the SAV effects as seen in the model simulations for this area.

Effects considered during scoring consist of slight increase of salinity with future project conditions and resulting transitional effects on *V. americana* communities.

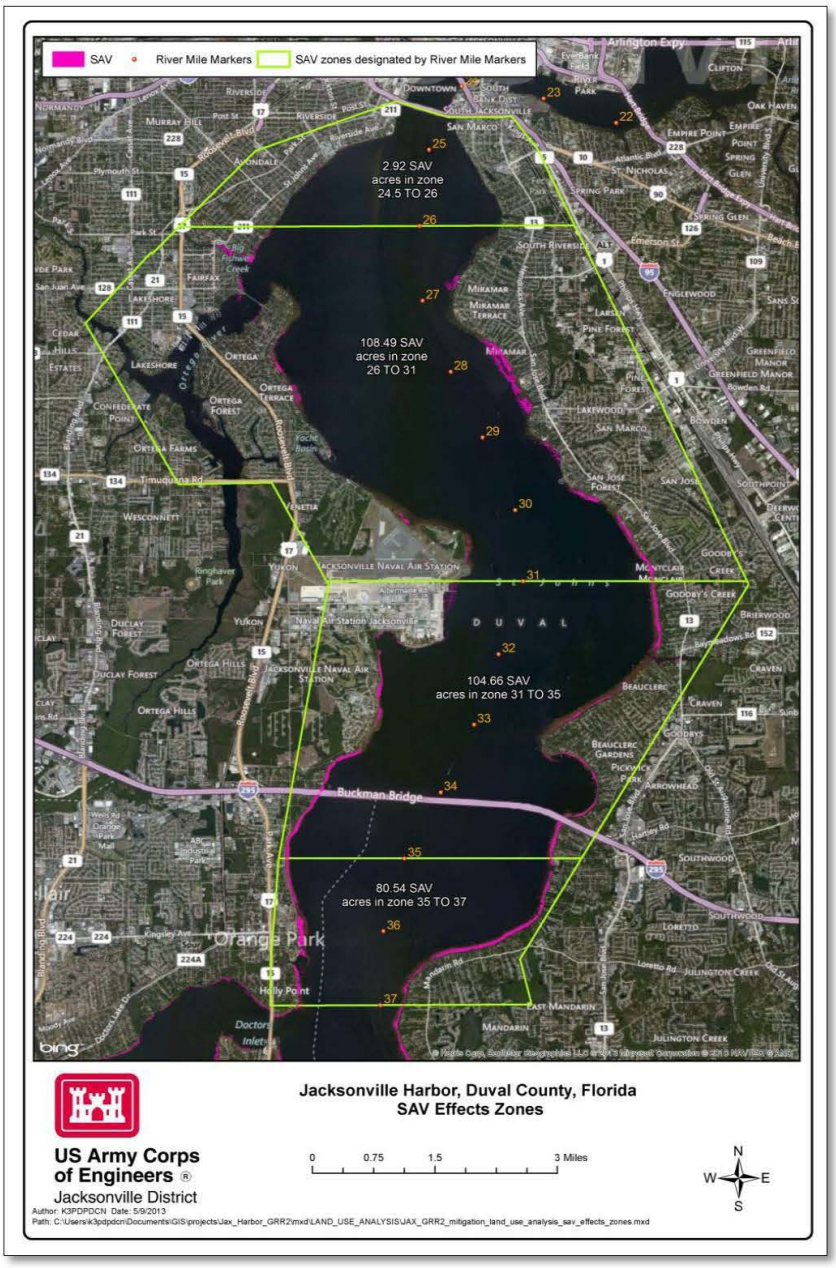

Figure 18. SAV UMAM effects assessment zones and associated estimated SAV acreage

3.5.1 *Effects for Zone 1*

This area covers the LSJR from approximately River Mile 24.5 to 26 (approximately the Fuller Warren Bridge to 1.5 river miles upstream). SAV beds are sparse and extremely intermittent in this area with an estimated abundance of SAV covering approximately 2.9 acres in this area (approximately 1.9 acres/mile). Multiple SAV stressors exist in this area including water flow rates, salinity, water quality, shoreline development, etc. The area has high water velocities due to the narrow river width at River Mile 25 which can increase turbidity and may have a negative effect on SAV recruitment and growth. The presence of heavy boat traffic may also limit SAV health. Additionally, the LSJR water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels (FDEP 2008). Based on these factors, wildlife utilization in this area would be less dense and/or less diverse than a less stressed SAV community. Only minimal benefit would be provided to downstream areas.

The ecological model for *V. americana* shows that under future with project conditions, under the conservative model simulation conditions, this area will experience up to a 5-9 percentage point increase in moderate to extreme salinity stress frequency. Due to the already stressed conditions, some areas within this zone may experience some loss of less salinity tolerant vegetation such as *V. americana* or *N. guadalupensis*. Recruitment of more salt tolerant vegetation such as *R. maritima* or others may not readily occur due to the existing multiple stressors. The stress increase could also cause already stressed *V. Americana* to decline in biomass or could cause increase to stress effects within the *V. Americana* communities such as growth height or rate.

3.5.2 *Effects for Zone 2*

This area covers the LSJR from approximately River Mile 26 to 31 (approximately 1.5 river miles upstream of the Fuller Warren Bridge to NAS-JAX). SAV beds are sparse and somewhat intermittent with an estimated abundance of SAV covering approximately 108.5 acres in this area (approximately 21.7 acres/mile). The area experiences habitat use by species as travel corridor and minimal to moderate residence due to sparse SAV. Water levels and flow in the area are appropriate for SAV growth although heavily developed littoral areas along the shoreline may limit growth. The LSJR water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels (FDEP 2008) which likely lead to declines in function.

The ecological model, under the conservative model simulation conditions, for *V. americana* shows that under future with project conditions this area will experience up to a 5 percentage point increase in moderate to extreme salinity stress frequency. This stress increase could potentially cause already stressed *V. americana* beds to minimally decline in biomass or effect growth height or rate of *V. americana*. Due to the slight percentage of increased stress frequency for this area, loss of SAV is expected to be only minimally different from without project conditions.

3.5.3 *Effect for Zone 3*

This area covers the LSJR from approximately river mile 31 to river mile 35 (approximately NAS-JAX to 1 river mile upstream of the Buckman Bridge). SAV beds are persistent yet still experience salinity stress, with an estimated abundance of SAV covering approximately 104.7 acres in this area (approximately 26.2 acres/mile). Water levels and flow in this area are appropriate for SAV growth and habitat use by aquatic fauna is likely high due to the persistent beds. The LSJR water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels (FDEP 2008) which likely impairs some function.

The ecological model, under the conservative model simulation conditions, shows that under future with project conditions *V. americana* in this area could experience up to a 5 percentage point increase in stress frequency. This stress increase could potentially cause already stressed SAV beds to marginally decline in biomass or possibly induce stress effects such as altered growth height or rate of *V. americana*. However, due to the slight percentage of increase stress frequency for this area, loss of *V. americana* is expected to be only minimally different from without project conditions.

3.5.4 *Effect for Zone 4*

This area covers the LSJR upstream of River Mile 35. However, since changes due to future with project conditions are predicted to occur only between River Mile 35 to 37 (approximately 1 mile upstream of the Buckman Bridge to Doctors Lake), the effects zone is therefore limited to these two miles when considering effects to SAV.

SAV beds in this area are persistent; only experiencing moderate to extreme salinity stress on minimal and infrequent basis. These two miles contain an estimated abundance of SAV covering approximately 104.7 acres (approximately 40.3 acres/mile). Water levels and flow in this area appropriate for SAV growth and use by species is likely very high due to the persistent beds. Similar to the other zones, the LSJR water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels (FDEP 2008).

The ecological model, under the conservative model simulation conditions, shows that under future with project conditions *V. americana* in this area will experience up to a 5 percentage point increase in stress frequency. This stress increase could potentially cause already stressed *V. americana* beds to marginally decline in biomass or possibly effect growth height or rate of *V. americana*. However, due to the slight percentage of increase stress frequency for this area, loss of *V. americana* is expected to be only minimally different from without project conditions.

3.5.5 *Summary of UMAM Scoring for SAV*

Overall, the proposed project could potentially produce a functional loss of 21.1 units for SAV in the LSJR main stem (see attached UMAM worksheets). Table 12**Error! Reference source not found.** shows the UMAM scores for SAV assessment zones as well as calculated functional loss (FL) for future with project conditions.

Table 12. UMAM evaluation scores for SAV assessment zones, estimated SAV abundance per zone, and calculated functional loss

Assessment Zone	Baseline[1]	With Project [2]	Delta	Estimated Acreage	Functional Loss[3]
1	0.37	0.17	0.20	2.9	0.6
2	0.5	0.43	0.07	108.5	7.6
3	0.7	0.63	0.07	104.7	7.3
4	0.8	0.73	0.07	80.5	5.6
				Total	21.1

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional loss

4 Mitigation

In accordance with Section C-3(b)(12)(e) of ER-1105-2-100 (ER-100), mitigation opportunities are under consideration to compensate for effects caused by the proposed project. The UMAM functional analysis identified 87.01 and 21.1 functional units of compensation required to replace or substitute for remaining, significant unavoidable losses of wetlands and SAV, respectively. The mitigation options and associated analysis will be in compliance with all applicable laws, policies, and regulations. USACE, in coordination with the interagency team, will ensure that both the NED Plan and LPP contain sufficient mitigation to compensate for effects on ecological resources. The mitigation options for the Jacksonville Harbor GRRII project include six potential opportunities under consideration:

- Restoration, Enhancement, Creation Potential Measures
    - Funding of Timucuan (TIMU) Management and Analysis
    - Funding of FFWCC Habitat Management Programs
    - Funding of Nutrient Reduction Projects
- Acquisition of Lands for Conservation
- Purchase of Mitigation Bank Credits

The final mitigation plan may include one or more of the above options.

4.1 Mitigation Options Analysis

In accordance with Section C-3.d.(3)(l-m) of ER-100, a mitigation options analysis has been produced to ensure that unavoidable damages to any significant ecological and wetland resources have been compensated to the extent justified; and, that restoration opportunities for significant ecological resources have been given appropriate consideration.

4.1.1 *Restoration, Enhancement, and Creation*

4.1.1.1 *Restoration*

The wetlands that would be affected as a result of the proposed project are mainly palustrine, forested wetlands that are tidally-influenced along the shoreline. There is a lack of available areas for wetland restoration in the targeted system.

Figure 19. Map of the Lower St. Johns River watershed for the project area

Within the intensely-developed greater Jacksonville area, affected wetland areas have been converted into residential, urban, and industrial development, mostly during pre-Clean Water Act years. Current wetland regulations limit additional effects to these areas. It is not practicable to purchase these residential areas for conversion back to wetlands as the cost would likely be prohibitive and purchase would likely require condemnation.

Additionally, many of these areas have been altered to the point that restoration is not feasible. It would be extremely difficult to pinpoint prior soil elevations and organic layers were probably removed before backfilling was accomplished. As a result, soils are likely poor and success of the restoration areas would be negligible. The USACE has also not identified viable restoration opportunities available upstream of Black Creek to the extent needed for the proposed project.

Regarding large potential restoration efforts in the area, the removal of the Rodman Dam has been suggested as a wetland restoration measure that could be included in the mitigation options. Built as part of the Cross-Florida Barge Canal during the 1960's, the dam was transferred from the USACE to the State of Florida in the 1990s. Although there would likely be environmental benefits from restoration of the Ocklawaha River and associated wetlands in this area, there is a considerable controversy regarding elimination of the dam that is unresolved and could substantially delay implementation of the feature in any mitigation plan. Delay in implementation of a mitigation plan, such as Rodman Dam, could lead to a great deal of temporal loss of wetland function before any mitigation plan was implemented, and possibly the need to develop an alternative compensatory mitigation plan in the future. Therefore, Rodman Dam removal is not included as part of the compensatory mitigation options in this report.

As the lack of potential restoration areas with tidally-influenced forested wetlands was established, forested palustrine sites that are within the watershed but lacked a tidal influence were explored. In undeveloped land within northeast Florida, many of the mixed-forested wetlands are typically large wetland swales that develop into creek systems before draining into a tributary of the LSJR. These lands are typically surrounded by pine flatwoods that have been converted for silvicultural uses. Many of the mixed-forested systems are intact, but have been subject to logging activities. These areas offer ecosystem restoration for planting of logged wetland areas. The pine flatwood areas offer potential for restoration as a result of furrowing and elimination of the groundcover and natural fire regime. However, these upland restoration actions are out-of-kind in comparison to the project effects. There are some forested-mixed wetland areas that were ditched or drained in the past that offer restoration potential, but many of the most viable areas have now been restored and/or converted into wetland mitigation banks. Purchase of credits from a mitigation bank would consolidate the mitigation into one area thus making it environmentally preferable.

4.1.1.2 *Enhancement*

Enhancement opportunities typically consist of natural resources management such as exotic control, hydrologic improvements or other applications to existing wetlands. For wetland-specific enhancement, activities could occur with onsite (affected wetlands) or offsite (other wetlands within the drainage basin) wetlands. For onsite wetlands that would be affected by the project, only those along Pottsburg Creek would offer any potential

for enhancement. The other wetlands that would be affected by the project are generally devoid of exotic species and display appropriate hydrologic conditions. Along Pottsburg Creek, *Colocasia sp*. (Elephant Ear) has become established; however, many of these areas are on numerous parcels of private property. There may be difficulty in gaining access to all these lands, and with probable tidal re-dispersion likely in the future, complete elimination of *Colocasia* is probably not feasible. Control on only select parcels would not be productive as *Colocasia* is likely to become re-established in these areas as soon as treatment ceases.

Additionally, there is an absence of hydrologic improvements that could be accomplished in most onsite wetlands that would produce substantial improvements. Except for Pottsburg Creek, most of the other major tributaries have excellent hydrology. Pottsburg Creek has been affected by numerous canals and drainage features; however, removal of these features would not provide adequate functional lift to offset project effects. Most of the canals and drainage features function to convey floodwaters off adjacent properties. These features have been incorporated into the local drainage system, and it is unlikely that any substantial changes could be made that would not require significant effects on the public.

In exploring enhancement options for offsite wetlands, difficulties are presented for the same reasons as onsite wetlands. Property access is often difficult and treatment is not likely to be successful. For hydrologic improvements, it is often extremely difficult to conduct hydrologic improvements without affecting private properties. As a result, wetland enhancement is not recommended for compensatory mitigation for the proposed project.

Other methods of enhancement were also explored as a method to offset unavoidable effects. The funding of habitat management support and analysis (see section 4.1.4 and 4.1.5) can provide important information to sustain and improve resource numbers of important commercial and recreational species. Information gained can be utilized by resource agencies to better develop species management plans, and limit harvest of keystone and other vital species within an ecosystem. Additionally, the support and analysis can prove to be essential for evaluating changes to an ecosystem, whether due to sea level rise, salinity changes, increased hunting and fishing, etc. As such, habitat management support and analysis is recommended for inclusion in the mitigation options for the proposed project.

Another method of enhancement is nutrient reduction, which is usually accomplished through construction of storm water treatment areas, wetland treatment systems, or other removal features. For the proposed project, excess nutrient discharges into the St. Johns River can cause harmful algal blooms, which block light from penetrating the water column and subsequently harm SAV. Treatment systems are already in operation within the area, and have proven successful at the removal of excess nitrogen from local drainage features. As such, nutrient reduction presents a viable mitigation option for the proposed project.

4.1.1.2.1 *TIMU Management and Analysis Support*

The TIMU Preserve has identified several study areas that would assist it in the identification of ecological change and mitigation of effects on key system resources for future occurrences that could alter the integrity of the Preserve. These study areas encompass continued analysis of community structures within wetlands, plankton blooms and eelgrass habitat management, and fishery nurseries/biotic community structure (fish and benthic macroinvertebrates). The mitigation option would include contribution for five assessment categories in the study areas that would serve to provide future mechanisms for further habitat management and improvements within the TIMU Preserve. The five assessment categories are:

- Continuous and monthly water quality monitoring;
- Coastal assessment;
- Amphibian, vegetation and bird monitoring;
- Salt marsh elevation and health; and,
- Secretive marsh birds.

The five categories would build upon existing assessment programs already in use by the NPS to analyze natural resources. The contribution would enable four years of sampling, support and maintenance for continued data development and analysis.

4.1.1.2.2 *Florida Fish and Wildlife Conservation Commission Management Support*

The FFWCC has identified study areas that could assist in habitat management within the Lower St. Johns River Watershed. Supplemental data collection on the composition, sizes, age classes, and residence times of freshwater fish would provide a more comprehensive analysis to better regulate/manage freshwater fisheries in the study area. A second effort would be designed to examine the importance of SAV to fisheries abundances and compositions. SAV sites would be paired with non-SAV sites for a comparison of fisheries utilization. The mitigation option would provide contribution for the following studies:

- Freshwater fisheries data gaps (3 years)
- Nekton composition, abundance, and use of freshwater SAV (5 years)

4.1.1.2.3 *Nutrient Reduction (SAV mitigation)*

Presently, there are no existing mitigations banks for SAV. As well, there have been no documented successes with SAV restoration projects such as transplanting or colony establishment in a tidally influenced, fresh to oligohaline river environment such as the LSJR. Thus, mitigation in the form of reduction to nutrient input to the LSJR is proposed as mitigation to offset SAV effects from the Jacksonville Harbor deepening project. The discharge of nutrients into the LSJR is widely recognized as the most significant factor affecting the river's water quality and biota. Nutrient reduction by means of reducing total nitrogen or total phosphorus input into the river would promote health and restoration via water quality improvements. Such improvements to water quality are expected to decrease

eutrophication, frequency of algal blooms and improve water transparency and light penetration. Nutrient reduction would also decrease epiphytic algal growth on leaf blades and allow for better SAV growth.

Under criteria defined in Section 303 (d) of the Clean Water Act, the LSJR has been designated by the FDEP as impaired by nutrients based on elevated chlorophyll a and Trophic State Index (TSI) levels. A Total Maximum Daily Load (TMDL) for total phosphorus and total nitrogen has been established to restore the river so that it meets its applicable water quality criteria for nutrients and dissolved oxygen. This TMDL was developed by FDEP in cooperation with the SJRWMD as part of its creation of pollutant load reduction goals for the river.

The USACE is proposing use of nutrient reduction within the LSJR watershed to compensate for SAV effects of the proposed project. The nutrient reduction projects that would be implemented by the USACE would not take the place of any regulatory requirements necessary to meet TMDLs that have been established for a permitted entity within the area. Any resulting benefits from the implementation of projects intending to mitigate for effects to SAV will be in addition to ongoing efforts to meet TMDL goals and improve the watershed's impairment status.

A portion of the reduction goals include reduction to agricultural non-point source inputs. The Basin Management Action Plan (BMAP) for the implementation of TMDL for nutrients for the LSJR main stem indicates that nutrient reductions from agricultural land uses will be achieved though in-field Best Management Practices (BMP) and treatment of agricultural runoff with Regional Stormwater Treatment (RST) facilities (BMAP 2008). These RSTs or similar projects provide a mitigation opportunity to achieve nutrient reduction within the LSJR.

Farmland in the tri-county agricultural area (St. Johns, Putnam, and Flagler Counties) transport much irrigation and storm water runoff directly into natural waterways. Runoff from these farmlands, which tends to be nutrient-rich from fertilizers from years of agricultural production, makes its way to the LSJR. The high nutrient concentrations promote algal blooms that deplete oxygen from the water and block sunlight from reaching SAV.

RST facilities have been implemented as pilot projects to reduce this nutrient loading. In two examples, partnering agencies have constructed a two-part regional storm water treatment system. In the first part, the irrigation and storm water runoff from fields flows to the regional storm water treatment ponds where nutrients settle to the bottom. The second project component includes conducting slow-flowing water though created wetlands where the nutrients are absorbed by the vegetation further reducing the nutrient concentration before the water empties into the LSJR. For this mitigation component, USACE would partner with and provide funding to an entity to implement the proposed RST or similar project(s). The actual RST or similar project used will depend on project

availability at the time funding for mitigation is appropriated. The implementation of the project may include land acquisition, facility construction, and operation and maintenance.

A direct correlation between nutrient reduction and benefits to *V. americana* has not been determined. However, nutrient reduction does result in substantial water quality benefits, including water clarity, which improves light penetration and growing conditions for *V. americana*. Water clarity is a known limiting factor for *V. americana* recruitment within the LSJR (SJRWMD 2012). In consideration of the level of stress to *V. americana* predicted by the model, the interagency team has considered a 5% reduction in the amount of total nitrogen discharged from non-point sources in the *V. americana* affected areas being appropriate to offset the effect. Implementation of one or more RSTs or similar facilities would provide nutrient reduction to meet the 5% reduction target. Each RST would have an associated estimated yearly mass reduction for total nitrogen. Table 13 shows potential RST projects as provided by the SJRWMD with estimated nitrogen load reduction in kilograms per year. The USACE will continue to coordinate with agencies and stakeholders regarding other potential nutrient reduction opportunities.

Table 13. Potential nutrient reduction RST projects

SJRWMD Tri-County Ag Projects	Estimated Nutrient Reduction (Total Nitrogen in kg/yr)
Crescent Lake/Bull Creek Regional Water Reuse	27,304
Crescent Lake/Bull Creek Regional Wet Detention	14,835
Elkton Drainage Ditch Regional Water Reuse	18,800
Elkton Drainage Ditch Regional Wet Detention Pond	10,215
Deep Creek East SWAP Regional Water Reuse	7,219
Deep Creek East SWAP Regional Wet Detention	3,922
Deep Creek Outlet Regional water reuse	2,390
Deep Creek Outlet Regional Wet Detention	1,299

This estimated nutrient reduction value would be used to reach the 5% TMDL non-point source reduction. Table 14 demonstrates an example using the total TMDL agricultural allocation. The total nitrogen allocation is given as 199,288 kg/yr (BMAP 2008) with 5% of this value at 9,964 kg/yr. The project life considered at 50 years would equal 498,220 kg total nitrogen reduction as mitigation for project SAV effects.

Table 14. Total TMDL agricultural allocation, 5% of allocation per year, and 50 year total nitrogen reduction.

Total Ag. Allocation (kg/yr)	5% of Ag Allocation (kg/yr)	50 yr Project (kg)
199,288	9,964	498,220

Estimated amounts of RST project nitrogen reduction would be used to calculate the effective number of years of RST project implementation. For instance, Crescent Lake Water Reuse and Elkton Drainage Ditch Water Reuse projects combined total an estimated nitrogen reduction of 46,104 kg/yr (Table 15). Using these projects, this yearly reduction

would require 11 years of RST implementation to effectively reach the total mitigation reduction value (498,220 kg).

Table 15. Example calculation with RST project reductions of nitrogen and number of effective years of RST project implementation for O&M costs only.

Est. RST Project Reductions (kg/yr)	Effective Years of Nutrient Reduction
46,104	498,2220/46,104 = ~11 years

At the time of mitigation, if the facilities are already in operation, the calculation method above would provide number of operational years that the RST would be implemented. However, the high start-up cost for nutrient reduction projects, which could include land acquisition and facility construction, is typically an impediment to implementation of a nutrient reduction program. If land acquisition and construction of the RST are required, then a portion of the mitigation would be dedicated to the start-up cost. Operational years would be calculated as the percent of the total cost (land acquisition, construction, and total number of year required operation and maintenance) and implemented for that percent of the total number of required years. For instance, using the above example, if estimated land acquisition and construction equal approximately 60% of total cost for the selected RST project implementation, then O&M would make up the remaining 30% of cost (Table 16). In the provided example, 30% of the total cost would allow for approximately 3 year of O&M in addition to the start up costs.

Table 16. Example calculation of percentage land acquisition, construction, and O&M costs with number of effective years of RST project implementation.

Percentage Land Acquisition and Construction of Total Cost	Percentage O&M of total cost	Operational Years
60%	30%	11 yrs * 30% ~3 years

Since the majority of the downstream reach of the LSJR near the SAV effects area is heavily developed, RSTs or similar projects would likely be located in the freshwater reach of the river where land is more available and facilities could be adequately sized. An estimated distance of approximately 32 miles upstream from the most downriver SAV project effects was used approximate the location of the proposed RST or similar facility and provide an estimated acreage of downstream SAV beds to benefit from the water quality improvement. This acreage is based on SJRWMD mapping (SJRWMD 2009) and is estimated to be approximately 949 SAV acres The SAV benefit as a result of the mitigation provides for functional gain for nutrient reduction of 47.45 units.

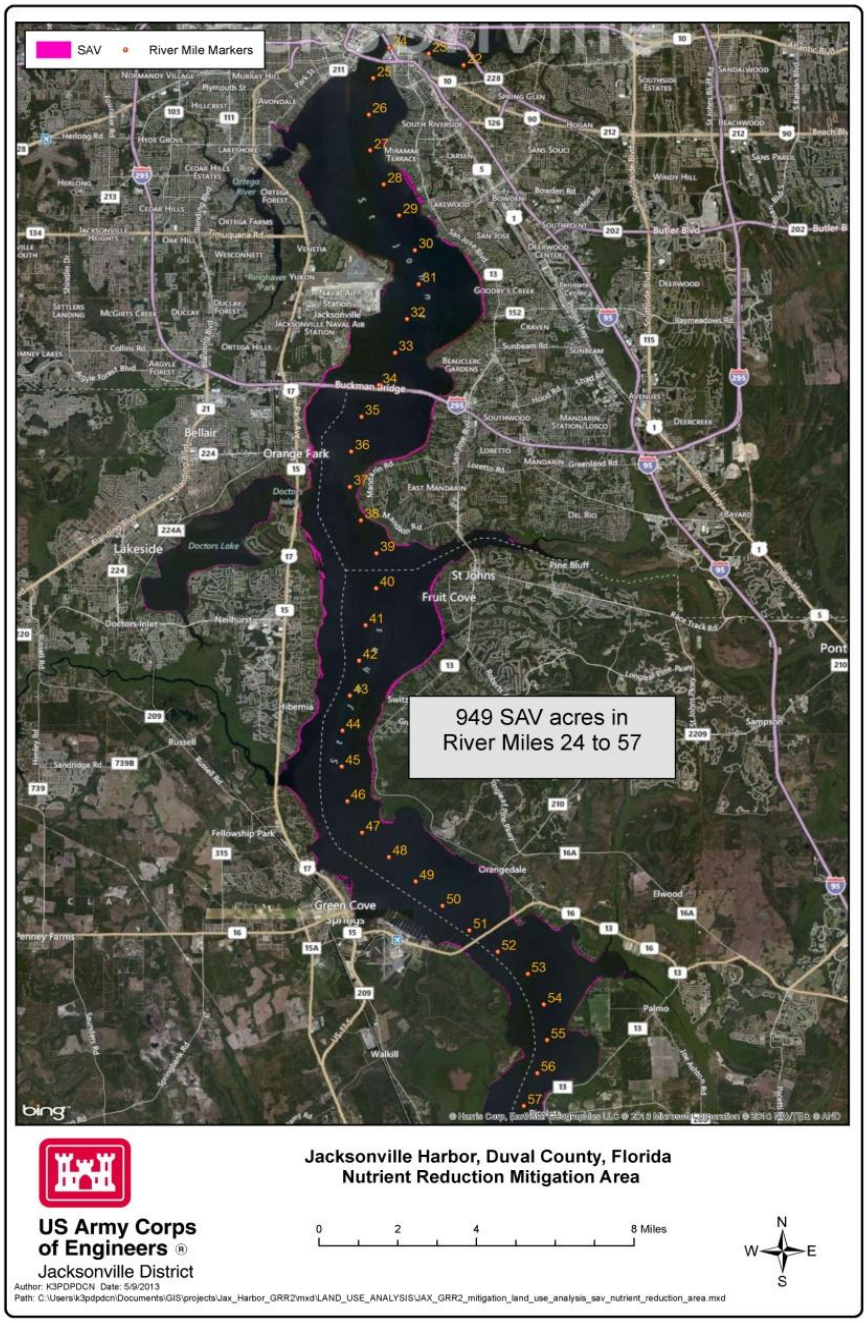

Figure 20. Nutrient Reduction Mitigation Area

Table 17. Nutrient Reduction UMAM results

Nutrient Reduction Mitigation Area	Delta	Estimated Acreage	Functional Gain[1]
River Mile 24.5-57	0.05	949	47.45

1. Calculated UMAM functional gain

4.1.1.3 *Creation*

Wetland creation was considered as a form of compensatory mitigation for the proposed project. For wetland creation, uplands are typically excavated to the elevation of adjacent wetland areas in order to establish a similar hydroperiod and then are planted with hydrophytic vegetation. The creation opportunities needed to offset project effects are of insufficient quantity in the project area. Additionally, as these areas would typically need to be located adjacent to wetlands for reference elevations, there would be a great deal of disturbance to the area and the risk would be high that disturbance of the substrate and altered hydrogeomorphology of the uplands could actually lead to disturbances and disruption of the natural hydrology in the adjacent wetlands. Furthermore, the value of established wetlands is often less than other methods of functional replacement and often has a higher risk. The design and grading are often inexact and can lead to problems in hydrologic function, with poor nutrient content in the undeveloped soils leading to problems in the establishment of a proper plant community.

4.1.2 *Acquisition of Lands for Conservation (Preservation)*

Preservation is typically considered if a) the wetlands provide important physical, chemical, or biological functions for the watershed; b) the areas contribute significantly to the ecological sustainability of the watershed; and, c) The resources are under threat of destruction or modifications. There are wetlands areas south of the City of Jacksonville urban core that have remained relatively un-impacted; there are some high value sites that could be conserved. With economic activity increasing after a period of downturn, these sites are again experiencing development pressure, particularly in areas located adjacent to the river. These wetland areas are instrumental in maintaining water quality and providing pristine freshwater habitat. Current conservation planning efforts within the vicinity of the proposed project were explored to determine if any conservation lands have been identified or prioritized for preservation, and that could be utilized to offset effects of the proposed project.

A potential conservation site has been identified that contains considerable forested wetlands, plus mesic flatwoods, freshwater marsh, and a portion of disturbed uplands. As part of the mitigation options, conservation lands would be acquired and preserved in perpetuity. The conservation lands are high quality wetlands that are intersected by two large upland areas. The wetlands at the site provide important physical, chemical, or biological functions and contribute significantly to the ecological sustainability of the watershed. The potential site bounds existing conservation lands and totals 594.65 acres. Although there is not a current development plan that has been filed for the preservation area, the site to the north, similar in profile, has been developed.

An analysis was conducted to determine effects to the area if the site were to be developed for residential purposes. Based on two scenarios, one a combination of a large, single-family residential and two multi-family, residential developments, the other continued

silvicultural activities, effects on uplands and wetlands at the site were quantified. Based on preservation of this site and avoidance of those effects, the UMAM assessment conducted for this area resulted in an increase of 76.10 functional units.

Table 18. Wetland Conservation Lands UMAM Results

Wetland Conservation Lands UMAM Results					
Type	Baseline[1]	With Project[2]	Delta	Acreage	Functional Gain[3]
Wetlands	0.66	0.86	0.13	585.43	76.10
TOTAL					76.10

1. UMAM score for the baseline wetland
2. UMAM score for with project
3. Calculated UMAM functional gain

Additionally, following coordination with the National Park Service, potential conservation sites were explored that exist within or adjacent to the existing TIMU Preserve. These areas are all under threat of development, are ecologically sensitive, and provide irreplaceable wetland functions. Several sites were selected for conservation based on likelihood of development, ecological importance, and aquatic habitat. Most of the area identified for conservation is composed of island/shoreline habitat and tidal salt marsh wetlands. The conservation areas provide essential foraging and nesting habitat for wading birds, and also serve as reproductive grounds for numerous species of fish and invertebrates. These lands would be eliminated from potential development and be preserved in perpetuity, with the increased benefit of being managed as part of the TIMU Preserve. Overall, 43.77 acres of lands would be purchased to offset project effects.

4.1.3 *Mitigation Bank Wetland Credits*

Mitigation banking credit purchase has been authorized as a mitigation opportunity for Water Resources Development Projects (WRDA 2007, sec 2036). The appropriate number of credits to compensate for project effects will be purchased from mitigation banks within the LSJR Watershed. The proposed project is in the area of approved mitigation banks, and the banks have the appropriate number and resource type of credits available. Contribution to the mitigation banks would consolidate ecosystem restoration within the watershed, and would provide important habitat, nutrient cycling and floodwater storage functions among others.

5 Conclusion

Regarding mitigation for loss of function in freshwater wetlands, the conservation lands would provide a functional gain of 76.10 units, in combination with another option which may include the purchase of the appropriate number of wetland credits from a Mitigation Bank, would be sufficient to replace and/or substitute for 87.01 wetland functional units of loss. For SAV, nutrient reduction in the amount of 5% of the TMDL for the agricultural allocation in the provided example would provide for up to a functional gain of 47.45 units.

SAV mitigation will be in an amount sufficient to replace the loss of 21.1 functional units. In addition, the mitigation options provide Management and Analysis Support for both the TIMU Preserve and FFWCC, as well as conservation lands that would be incorporated into the TIMU Preserve. Although the Management and Analysis Support contributions cannot be quantified using a UMAM assessment, they would serve to increase management potential and improve significant resources within the Lower St. Johns River Watershed. The additional TIMU Preserve lands would continue to provide habitat functions within the park area and with increased management could gain additional value.

In addition, a comprehensive monitoring plan has been developed in conjunction with the proposed mitigation. The monitoring plan can be found in Appendix F. In coordination with other agencies, the USACE has developed a long-term monitoring plan in order to determine whether the effects assessment has accurately predicted the effects. Monitoring data will also be used to evaluate whether the proposed mitigation sufficiently offsets the predicted effects. The results of these monitoring and analyses will be available to agencies and stakeholders. In addition, an adaptive management plan has been developed. For this project, adaptive management is defined as evaluating the accuracy of the predicted environmental effects and assessing the effectiveness of the mitigation features to ensure the levels of environmental effects predicted in the Draft Supplemental Environmental Impact Statement (DSDSEIS) are not exceeded. The adaptive management plan can be found in Appendix G.

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UMAM WORK SHEETS

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Black Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	150.45

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Black Creek	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Black Creek is a tributary of and receives tidal flows from the St. Johns River.

Assessment area description

The area encompasses the forested, tidal floodplain of Black Creek. Tidal range is approximately 1-ft and the area has excellent hydrology. Trees are mature (app. 60-80 yrs) and ground cover is full and appropriate. Habitat utilization is high with alligators and high fish populations.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Black Creek is located along the St. Johns River in Middleburg, near the City of Green Cove Springs. There are several conservation areas in the close vicinity.	The area is not unique and is typical of other tidal wetlands within the lower St. Johns River basin.
Functions	**Mitigation for previous permit/other historic use**
The Black Creek wetlands function as floodwater storage, water filtration and water quality improvements, and wildlife habitat among others.	The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by wading and migratory birds, reptiles, amphibians and small and large mammales. The aquatic environment is high quality and sustains excellent fish populations.	The site is utilizated by manatees, an Endangered Species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators and numerous wading and migratory birds were observed during a site visit. Many fish were seen in the water with many breaking the surface.

Additional relevant factors:

Some tree mortality can be observed within the mouth of Black Creek, which could be due to rising salinity levels in the area. Black Creek serves a large drainage basin and some saltwater influence is likely mitigated by immense freshwater flows that come out of the basin during rainfall events.

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	12-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Black Creek Freshwater Swamp
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	20-Mar-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 9	with: 8
The area is mostly undeveloped with wildlife corridors extending downstream. Excellent support for wildlife with minor development along Creek. Exotic vegetation was not observed in the surrounding area. The are does provide adequate benefits to other hydrologically connected areas and no impediments or flow restrictions exist. **With the project**, there may be some decreased support for wildlife species due to rising salinity in the tidal freshwater area to the west. No barriers, impediments or flow restrictions would be created. Land use outside the area would remain consistent.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 6
Water levels and flows are appropriate for the area and water level indicators are consistent. Evidence of soil subsidence minimal to none. Community zonation typical of an area experiencing increased salinities, with some hydrologic stress occurring to the canopy and likely loss of some salinity intolerant groundcover. Animal use is consistent with expected hydrologic conditions. Water quality in this area is degraded. **With the project**, slight increase to salinity anticipated in areas under high tide. Soil erosion would not occur and soil moisture would be appropriate. Some changes in community might occur with an increase in halophytic vegetation. Water quality would remain degraded.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 9	with: 7
Plant species in the canopy, shrub and ground stratum are mostly appropriate. No exotics are present. Age and size distrubution appropriate for a transitional area. The area is not managed. The creek channel has not been altered, and some buffer area does exist behind the floodplain. **With the project**, there is likely to be increased salinities with encroachment of halophytic vegetation further into the freshwater areas. Red Maples, Ash and other salt intolerant canopy species are likely to experience additional stress. Regeneration and recruitment of these species may be reduced, with less effect on Cypress trees. The canopy may become more sparse in some areas that receive frequent tidal inundation.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.86	with: 0.7

Delta = [with-current]
0.16

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 24.07

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Cedar Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	16.77 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Broward River/Cedar Creek	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The tidal freshwater floodplain of Cedar Creek is a tributary of the Broward River, which receives strong tidal flows from the St. Johns River.

Assessment area description

The floodplain wetlands at the site are a high quality, tidal freshwater forested system. The canopy is fairly immature (20 yrs) however several large cypress do exist. Groundcover in this area is consistent with freshwater, long hydroperiod wetlands in NE Florida. Hydrology in the area was excellent with short, tidal creeks emerging from the mainstem. Adjacent developments have avoided wetland areas with appropriate buffers in place.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The wetlands are connected to the Lower St. Johns River.	The area is not unique and is typical of a tidal, freshwater system in NE Florida.

Functions	Mitigation for previous permit/other historic use
The wetlands at the site serve important floodwater storage, carbon sequestration, wildlife habitat and water quality functions.	The wetlands at the site are not part of any mitigation and the area has functioned historically as a natural floodplain.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wetlands at the site provide excellent wildlife habitat.	The area is not likely utilized by any listed species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

A painted turtle and numerous small, migratory birds were observed during a site visit. The site also provides important aquatic habitat for fish.

Additional relevant factors:

The wetlands at the site are high quality and have been relatively unimpacted by development and other human-related activities. Water quality in this area is degraded.

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	17-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Cedar Creek
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	20-Mar-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 7
Support to wildlife by outside habitats is high; however, support for large fauna from downstream areas not likely due to proximity of development and lack of suitable areas. Exotic species not present in proximity to area. Wildlife access to the west limited by Interstate 9A. Downstream benefits not limited by barriers. Impacts of land use outside this area limited with buffers in place. Area provides substantial downstream benefits through hydrological connection. With project, downstream area may experience increased salinity, reducing some benefit to freshwater species. Exotics are not expected to colonize the area. Barriers for wildlife access would not increase. Downstream benefits would still be provided. Land use outside of area not expected to change, most of area has been developed with little opportunitiy for infill. Downstream areas would still remain hydrologically connected and benefit from discharges.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 7
Water levels and flows appropriate with water levels indicators consistent. Soil moisture appropriate with no evidence of subsidence. No soil erosion was observed. Community zonation of vegetation is appropriate with no evidence of hydrologic stress. Use by animal species with specific hydrologic requirements was observed. Plant community composition was appropriate. Area was flooded. Water quality is degraded. With project, water levels and flows expected to remain appropriate with consistent water level indicators. Soil subsidence and/or erosion is not anticipated. Vegetation community may experience changes, particularly along the shoreline with increases in salinities at high tides. Plant community composition in these areas may be altered, with some saline induced stress. Cypress is likely to become dominant in these areas. Areas further from the water may experience slight stress or would stay mostly unchanged.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 8	with: 7
Plant species in the canopy, shrub and groundcover layers are appropirate. No exotics present. Regeneration and recruitment of cypress is poor, with mostly other woody tree species becoming dominant. Age and size distrubition is of mostly younger trees. Moderate to optimal structural habitat present. Plants in good condition. Area is not managed. Topographic features present and normal. With project, plant species expected to remain appropriate with some transition of areas along shoreline towards halophytic vegetation. Age and size distribution may be altered along shoreline with some trees being stunted by increased salinities. Plants further from shoreline will remain in good condition with some subtle stress effects. Topographic features would remain.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.77	with: 0.7

Delta = [with-current]
0.07

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0.07*19.0 = 1.3

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Dunn Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	4.07

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Dunn Creek is a tidal tributary of the St. Johns River

Assessment area description
The freshwater wetlands in this area exhibit excellent hydrology and are of high quality. There is no evidence of soil subsidence. Cypress and Elm dominate the canopy with typical long hydroperiod groundcover.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The site is located along Dunn Creek, a tidal freshwater tributary of the St. Johns River.	The area is not unique and is typical of tidal tributaries of the St. Johns River.

Functions	Mitigation for previous permit/other historic use
The site serves important floodwater storage, water filtration and habitat functions.	The site has not been utilized as mitigation and historically functioned as a natural area.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Large and small mammals are expected to utilize the site. The creek serves as aquatic habitat for a number of fish species and invertebrates. Wading and migratory birds utilize the area, and it is also excellent habitat for reptiles and amphibians.	The site is not likely utilized by an listed species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):
No wildlife utilization was observed other than small birds.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	17-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Dunn Creek
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	17-May-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 9 — with: 8	Support to wildlife by outside habitats is high. Exotic species not present in proximity to area. Wildlife access limited only by developments to the east and west but corridors do exist. Downstream benefits not limited by barriers. Impacts of land use outside this area limited with buffers in place. Area provides substantial downstream benefits through hydrological connection. With project, there would likely be increased stress within stronger tidal areas but effects are likely to be subtle. Exotics are not expected to colonize the area. Barriers for wildlife access would not increase. Downstream benefits would still be provided. Downstream areas would still remain hydrologically connected and benefit from discharges.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 8 — with: 7	Water levels and flows appropriate with water levels indicators consistent. Soil moisture appropriate with no evidence of subsidence. No soil erosion was observed. Community zonation of vegetation is appropriate with no evidence of hydrologic stress. Use by animal species with specific hydrologic requirements was observed. Plant community composition was appropriate. Area was flooded. Water quality is degraded. With project, water levels and flows expected to remain appropriate with consistent water level indicators. Soil subsidence and/or erosion is not anticipated. Vegetation community zonation is not likely to change. Plant community composition would not likely shift.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 9 — with: 8	Plant species in the canopy, shrub layer and groundcover layers are appropirate. No exotics present. Regeneration and recruitment of vegetation normal for a transitional area, with healthier trees further from the creek. Age and size distrubition is appropriate. Optimal structural habitat present. Plants in good condition. Area is not managed. Topographic features present and normal. With project, no shift in plant species is expected to occur. Plant condition of freshwater vegetation in areas along the creek may slightly deteiorate. Age and size distribution likely to remain consistent although some trees along the shoreline may become stunted. Topographic features would remain.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.86	with: 0.76	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.40

Delta = [with-current]
0.1

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Durbin Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	62.27 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Durbin Creek	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Durbin Creek is a tributary of and receives tidal flows from the St. Johns River.

Assessment area description

The area encompasses the forested, tidal floodplain of Durbin Creek. The area has excellent hydrology and buffers are present along most of the wetlands. Trees are fairly mature and ground cover is full and appropriate. Habitat utilization is high with large reptiles, deer, wading birds and high fish populations.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Julington Creek is within an area that has experienced heavy growth but existing regulations have sufficiently conserved wetland areas. There are several conservation areas in the close vicinity.	The area is not unique and is typical of other tidal wetlands within the lower St. Johns River basin.
Functions	**Mitigation for previous permit/other historic use**
The Julington Creek wetlands function as floodwater storage, water filtration and water quality improvements, and wildlife habitat among others.	The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by wading and migratory birds, reptiles, amphibians and small and large mammales. The aquatic environment is high quality and sustains excellent fish populations.	The site is utilizated by manatees, an Endangered Species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators and numerous wading and migratory birds were observed during a site visit. Many fish were seen in the water with many breaking the surface.

Additional relevant factors:

Some tree mortality can be observed within the mouth of Julington/Durbin Creek, which could be due to rising salinity levels in the area. Durbin Creek serves a large drainage basin and some saltwater influence is likely mitigated by immense freshwater flows that come out of the basin during rainfall events. Stormwater facilities are typically appropriate to handle nutrient loads from residential development.

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	12-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Durbin Creek
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	12-May-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 9	with: 8
The downstream area is mostly undeveloped with wildlife corridors extending further into the headwaters. Excellent support for wildlife with minor development along Creek. Exotic vegetation was not observed in the surrounding area. The area does provide adequate benefits to other hydrologically connected areas and no impediments or flow restrictions exist. **With the project**, there may be some decreased support for wildlife species due to rising salinity. No barriers, impediments or flow restrictions would be created. Land use outside the area would remain consistent.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 6
Water levels and flows are appropriate for the area and water level indicators are consistent. Evidence of soil subsidence minimal to none. Community zonation typical of an area experiencing increased salinities, with some hydrologic stress occurring to the canopy and likely loss of some salinity intolerant groundcover. Animal use is consistent with expected hydrologic conditions. Water quality in this area is degraded. **With the project**, slight increase to salinity anticipated in areas under high tide. Soil erosion would not occur and soil moisture would be appropriate. Some changes in community might occur with an increase in halophytic vegetation. Water quality would remain degraded.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 9	with: 7
Plant species in the canopy, shrub and ground stratum are mostly appropriate. No exotics are present. Age and size distrubution appropriate for a transitional area. The area is not managed. The creek channel has not been altered, and some buffer area does exist behind the floodplain. **With the project**, there is likely to be increased salinities with encroachment of halophytic vegetation further into the freshwater areas. Red Maples, Ash and other salt intolerant canopy species are likely to experience additional stress. Regeneration and recruitment of these species may be reduced, with less effect on Cypress trees. The canopy may become more sparse in some areas that receive frequent tidal inundation.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.86	with: 0.7

Delta = [with-current]
0.16

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 9.96

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Julington Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	108.48 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Julington Creek	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Julingon Creek is a tributary of and receives tidal flows from the St. Johns River.

Assessment area description

The area encompasses the forested, tidal floodplain of Julington Creek. The area has excellent hydrology and buffers are present along most of the wetlands. Trees are mature (app. 60-80 yrs) and ground cover is full and appropriate. Habitat utilization is high with large reptiles, deer, wading birds and high fish populations.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Julington Creek is within an area that has experienced heavy growth but existing regulations have sufficiently conserved wetland areas. There are several conservation areas in the close vicinity.	The area is not unique and is typical of other tidal wetlands within the lower St. Johns River basin.
Functions	**Mitigation for previous permit/other historic use**
The Julington Creek wetlands function as floodwater storage, water filtration and water quality improvements, and wildlife habitat among others.	The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by wading and migratory birds, reptiles, amphibians and small and large mammales. The aquatic environment is high quality and sustains excellent fish populations.	The site is utilizated by manatees, an Endangered Species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators and numerous wading and migratory birds were observed during a site visit. Many fish were seen in the water with many breaking the surface.

Additional relevant factors:

Some tree mortality can be observed within the mouth of Julington Creek, which could be due to rising salinity levels in the area. Julington Creek serves a large drainage basin and some saltwater influence is likely mitigated by immense freshwater flows that come out of the basin during rainfall events. Stormwater facilities are typically appropriate to handle nutrient loads from residential development.

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	12-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Julington Creek
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact		12-May-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 9 — with: 8	The downstream area is mostly undeveloped with wildlife corridors extending further into the headwaters. Excellent support for wildlife with minor development along Creek. Exotic vegetation was not observed in the surrounding area. The area does provide adequate benefits to other hydrologically connected areas and no impediments or flow restrictions exist. **With the project**, there may be some decreased support for wildlife species due to rising salinity in the tidal freshwater area to the west. No barriers, impediments or flow restrictions would be created. Land use outside the area would remain consistent.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 8 — with: 6	Water levels and flows are appropriate for the area and water level indicators are consistent. Evidence of soil subsidence minimal to none. Community zonation typical of an area experiencing increased salinities, with some hydrologic stress occurring to the canopy and likely loss of some salinity intolerant groundcover. Animal use is consistent with expected hydrologic conditions. Water quality in this area is degraded. **With the project**, slight increase to salinity anticipated in areas under high tide. Soil erosion would not occur and soil moisture would be appropriate. Some changes in community might occur with an increase in halophytic vegetation. Water quality would remain degraded.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 9 — with: 7	Plant species in the canopy, shrub and ground stratum are mostly appropriate. No exotics are present. Age and size distrubution appropriate for a transitional area. The area is not managed. The creek channel has not been altered, and some buffer area does exist behind the floodplain. **With the project**, there is likely to be increased salinities with encroachment of halophytic vegetation further into the freshwater areas. Red Maples, Ash and other salt intolerant canopy species are likely to experience additional stress. Regeneration and recruitment of these species may be reduced, with less effect on Cypress trees. The canopy may become more sparse in some areas that receive frequent tidal inundation.

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.86	0.7

Delta = [with-current]
0.16

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 17.36

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor GRR2		Lower St. Johns River Main Stem - River Mile 42-45
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	11-Apr-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 7
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 8
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 9	with: 9

Without project: Support to wildlife from outside habitat is moderate. Presence of exotics is minimal though likely presence of some *Colocasia esculenta* . Aquatic access is open to wildlife. For land access, subdivision barriers exist but open land and Black Creek on west side of river provide adequate access. Many residence along immediate shoreline with docks lining the littoral edges of the river. Impact to land use minimal. Benefits to downstream, are moderate to good. With project conditions, no appriciable change will occur to wetlands within this assessment area.

Water levels and flows are appropriate for the area. Water level indicators distinct and consistent with expected. Soil with moderate evidence of sulfate reduction due to saline water innundation and corresponding erosion or deposition. Vegetation community zonation appropriate for salt marsh community. Hydrologic stress not evident. Use by animal species consistant with specific hydrological requirements. Plant community composition appropriate for salt marsh community. Water quality would remain impaired as established under theTMDL ratings.
With project conditions, no appriciable change will occur to wetlands within this assessment area.

Plant species, ground stratum, maybe Cyprus. Exotics not expected in tidal marsh. Regeneration and recruitment normal. Age and size distrabution typical of system with no deviation from normal. Distribution of wood debris not applicable for salt marsh community. Plant condition would be healthy. Topo features would remain. No evidence of siltation or algal growth. With project conditions, no appriciable change will occur to wetlands within this assessment area.

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.8	with: 0.8

Delta = [with-current]
0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor GRR2		Lower St. Johns River Main Stem - River Mile 45-50
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	11-Apr-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 8 — with: 7	Without project: Support to wildlife from outside habitat is moderate. Some development on the southwest river edge however other surrounding areas open. Some presence of exotics, *Colocasia esculenta*. Aquatic access is open to wildlife. Land access includes some subdivision barriers exist with open land on east side of river to provide above moderate access. Many residence along west/southwest shoreline with docks lining the littoral edges of the river. Impact to land use minimal due to some subdivisions and shipyard on the southwest edge of the river. Benefits to downstream, are above moderate. With project conditions, benefits to downstream would change to moderate due to the transitioning vegetation towards tidal marsh.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 — with: 5	Water levels and flows are appropriate for the area. Water level indicators distinct and consistent with expected. Soil with minimal to moderate evidence of sulfate reduction due to saline water innundation and corresponding erosion or deposition. Vegetation community zonation appropriate for transition community. Use by animal species consistant with specific hydrological requirements. Plant community composition appropriate for transition community. Water quality would remain impaired as established under theTMDL ratings. With project conditions, increased erosion or deposition, some due to subsidence with increased sulfate reduction, increased 3% with project. Vegetation community zonation towards tidal marsh
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 — with: 5	Most plant species desirable for area. Exotics are existing (*Colocasia esculenta*) but minimal. Age and size distribution changing towards salinity tolerant vegetation with younger vegetation more salinity tolerant. Fresh water vegetation older and with less recruitment. Distribution of woody debris present. Plant condition moderate. Land managment not applicable. Siltation or algal growth minimal. With project conditions, fewer fresh water exotics. Age and size distribution with tendancy towards more salinity tolerant vegetation and fewer fresh water vegetation. Regeneration and recruitment tending towards more salinity tolerant vegetation. Plant condition less than moderate with some stunted fresh water trees and increasing tidal marsh ground cover.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres: 0.73 — with: 0.57

Delta = [with-current]
0.23

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 19.90

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor GRR2		Lower St. Johns River Main Stem - River Mile 50-52
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	11-Apr-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 9	with: 9
Support to wildlife from outside habitat almost optimal with some development and docks on east edge of the river with majority open areas to the east and west. Minimal exotics may be present (Colocasia esculenta). Wildlife access open of aquatic organisms. Some residences and docks as barriers on east with all open land on west side of river. Impact to land use is less than minimal. Benefits to downstream are above moderate. With project conditions, no appriciable change will occur to wetlands within this assessment area.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 8
Water levels and flows are appropriate for the area. Water level indicators distinct and consistent with expected. Less than minimal erosion or deposition. Vegetation community zonation appropriate for tidal swamp community. Use by animal species consistant with specific hydrological requirements. Plant community composition appropriate for tidal swamp community. Water quality would remain impaired as established under theTMDL ratings. With project conditions, no appriciable change will occur to wetlands within this assessment area.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 9	with: 9
Plant species desirable for area. Exotics are existing (*Colocasia esculenta*) but minimal. Age and size distribution typical of system with no deviaion from normal. Recruitment and regeneration normal and natural. Distribution of woody debris less than minimal to non-existant. Plant condition good. Land managment not applicable. Siltation or algal growth minimal. With project conditions, no appriciable change will occur to wetlands within this assessment area.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.87	with: 0.87

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0

Delta = [with-current]
0

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor GRR2		Wetland Preservation Area
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation (Preservation)	Ray Wimbrough	7-May-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 9
Area is likely to be colonized by species such as Colocasia sp., Sapium sebiferum and possibly other exotics due to frequent disturbances from logging. Additionally, spread of unregulated ornamental vegetation may occur. Downstream habitats would receive considerably less benefit from discharges as frequent vegetation removal could reduce filtration capacity of wetlands and increase runoff. With preservation, plant species desirable for area. Exotics are existing (Colocasia esculenta) but minimal. Age and size distribution typical of system with no deviaion from normal. Recruitment and regeneration normal and natural. Distribution of woody debris less than minimal to non-existant. Plant condition good. Land managment not applicable. Siltation or algal growth minimal.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 6	with: 8
Some soil subsidence likely with furrowing activities and drainage due to construction of logging roads. Community zonation likely altered with planting and frequent logging of desireable species, possible loss of Cypress within canopy. With preservation, water levels and flows are appropriate for the area. Water level indicators distinct and consistent with expected. Less than minimal erosion or deposition. Vegetation community zonation appropriate for tidal swamp community. Use by animal species consistant with specific hydrological requirements. Plant community composition appropriate for tidal swamp community. Water quality would remain impaired as established under theTMDL ratings.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 7	with: 9
Presence of exotics but likely minimal. Regeneration and recruitment of certain plant species reduced due to frequent logging. Structural habitat burned during logging activities and absent. Topographic features altered due to activities of heavy machinery. With preservation, plant species desirable for area. Exotics are existing (Colocasia esculenta) but minimal. Age and size distribution typical of system with no deviaion from normal. Recruitment and regeneration normal and natural. Distribution of woody debris less than minimal to non-existant. Plant condition good. Land managment not applicable. Siltation or algal growth minimal.		

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.66	with: 0.86

Delta = [with-current]
0.2

If preservation as mitigation,
Preservation adjustment factor = 1
Adjusted mitigation delta = 0.20

If mitigation
Time lag (t-factor) = 1
Risk factor = 1.5

For impact assessment areas
FL = delta x acres = (0.13*585.43) = 76.10

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.13

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Ortega River

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	73.74

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Ortega River	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Floodplain Wetlands

Assessment area description

Salinities in this area would likely range from 0.0 to 0.4. The area is heavily influenced by freshwater inputs from rain, runoff and groundwater input. The wetlands in this system are located along the portion of the Ortega that loses its tidal influence. The canopy is dominated by typical species such as Acer rubrum, Taxodium distichum, Fraxinus sp. The groundcover is dominated by Sabal minor.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
There is more intensive development within this portion of the Ortega Watershed as it borders the area along I-295 and Blanding Blvd. Still, the area provides important benefits, both hydrologic and wildlife-based, to downstream areas. The area also functions as a wildlife corridor along the	The area is not unique however it does represent a forested floodplain wetland in a highly urbanized area.

Functions	Mitigation for previous permit/other historic use
The area functions as a floodplain wetland for major storm events in the area and also serves important water filtration functions. Habitat value at the site is near optimal.	The area is natural and had no previous historical use.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mammal species such as raccoon, possum, deer and bear can be found along this corridor. The area would function as important bird nesting and foraging habitat. Additionally, there are likely many different stages of fish, shrimp and other aquatics that utilize the site.	There are no know species that inhabitat or utilize the site.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife was observed during a site visit.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	17-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Ortega River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	17-May-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 8	with: 7
Salinities in this area would likely range from 0.0 to 0.4. The area is heavily influenced by freshwater inputs from rain, runoff and groundwater input. There is more intensive development within this portion of the Ortega Watershed as it borders the area along I-295 and Blanding Blvd. Still, the area provides important benefits, both hydrologic and wildlife-based, to downstream areas. The area also functions as a wildlife corridor along the Ortega River, and is connected to Black Creek. As a result of project, although upstream areas would remain intact, downstream areas would be affected by salinity increases and would be subject to a transition in vegetation. Loss of function from conversion of a forested to salt marsh intermediate system could reduce habitat filtration capacity of the wetlands, affecting downstream areas. The area could also experience some invasion by exotic species.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 6
The water would shift to a higher salinity concentration, which would affect the wildlife utilization in the area. Water quality would remain impaired as established under theTMDL ratings. Hydroperiod normal for area and standing water was observed throughout wetland. Water quality rated as impaired for this portion of St. Johns River. Area is not pyrogenic. Soils appropriate for area and well developed. Changes in vegetation community zonation would occur across the canopy, subcanopy and ground layer. Use by animal species with specific hydrologic requirements would experience a major shift as the community would undergo drastic changes. Soil erosion may increase as a result of canopy and subcanopy mortaility.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 9	with: 7
The wetlands in this system are located along the portion of the Ortega that loses its tidal influence. The canopy is dominated by typical species such as Acer rubrum, Taxodium distichum, Fraxinus sp. The groundcover is dominated by Sabal minor. There could be a partial change in age and size distribution within the canopy, particularly along the edges of the Ortega River that would be most affected by salinity changes. Also, although the canopy would remain mostly intact, there would likely be a shift in the groundcover and sub-canopy, decreasing the level of function that benefits fish and wildlife resources.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.83	with: 0.66

Delta = [with-current]
0.17

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 12.54

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Pottsburg Creek

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
		Impact	11.27

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Pottsburg Creek is a tidal tributary of the St. Johns River

Assessment area description

The site is near the end of the tidally-influenced wetlands of Pottsburg Creek. The area is a forested system dominated by Cypress, Elm and Ironwood. Groundcover is typically of a long hydroperiod wetland in NE Florida. The creek has been channelized for at least a portion and drainage canals enter the creek at two locations at the least. Water quality in the area is degraded. Development exists to the landward portion of all wetlands

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Pottsburg Creek is a tidal tributary of the St. Johns River	The site is not unique and is typically of other wetlands in the vicinity of greater Jacksonville.

Functions	Mitigation for previous permit/other historic use
The wetlands at the site serve water quality and filtration functions, as well as provide habitat for reptiles, amphibians and small mammals. The area also absorbs flood waters during extreme rain evets.	The site has not been utilized as mitigation and has existed as a natural area.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The area is used by migratory birds and other species as indicated above. There is not likely any utilization by large mammals due to the proximity to development and large residential areas. There are likely some residence freshwater fish species however the area is not likely used by typically estuarine species.	The area is not likely used by any listed species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):
Small birds were observed utilizing the site.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	17-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Pottsburg Creek
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	17-May-13

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 6
Support to wildlife by outside habitats moderate, large wetland systems located to the south. Area supports heavy populations of Colocasia, an exotic. Wildlife access to creek for aquatic species; however, access for terrestrial species extremely limited due to development. No aquatic barriers; moderate barriers exist for movement of large fauna. Moderate impacts to wildlife from outside assessment area as location is heavily developed landward of wetlands. Does provide minimal to moderate benefits to downstream areas. Minimal change to this category is anticipated as a result of the project. Downstream areas are expected to transition towards salt marsh, with a slight decrease in score due to this change. Wildlife access is anticipated to remain the same with slight shift to more estuarine-based species. Downstream water quality benefits should remain the same. There would be no change in distance or barriers.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 7	with: 6
Water levels and flows mostly appropriate for area; however, some canals may be affecting hydrology of adjacent wetlands. Creek has been channelized so differences in flow rates likely. Vegetation appropriate in most strata. Water quality is degraded. With project, slight increases in salniities at high tide is likely. Changes likely to be subtle with loss of a few species of salinity intolerant plants anticipated. Plant condition may be slightly affected for some species with small amounts of stress.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 8	with: 7
Plant species in canopy appropriate with Cypress, Elm and Ironwood. Ground cover and understory also appropriate. Area experiencing heavy invasion by Colocasia. Age and size distribution of vegetation appropriate with some mature trees. Plant condition fairly good. Side creeks affected by development and canals. With project, plant species to remain appropriate. No increase in exotics expected to occur. Plant condition for some species may be slightly affected by increased salinities, but changes likel to be subtle. No changes in land management expected.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.73	with: 0.63

Delta = [with-current]

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 1.12

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / River Mile 24.5-26		Submerged Aquatic Vegetation - V. americana - River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 4	with: 5

SAV beds are sparse and extremely intermittent with an estimated abundance of SAV covering approximately 2.9 acres in this area. The area support to wildlife by outside habitat is expected to be minimal due to lack of SAV downstream and sparse, stressed SAV beds immediately upstream. Wildlife access to and from this area would be open although a significant salinity barrier exists downstream. Significant, adverse impacts of land uses outside assessment area due to littoral development with altered shoreline and presence of boat traffic. The area offers minimal benefits to downstream.
With Mitigation: Area is expected to benefit from upstream nutrient reduction. SAV effected by mulitiple stressor conditions in the area (flow rate, light penetration, salinity, altered shoreline, etc.) would be alieviated by reduction in nutrient concentrations and increase in water quality and subsenquent increase light penetration. Area would provide increased benefits to downstream.

.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 3	with: 4

:
SAV in area experience frequent, moderate to extreme salinity stress at 26-45% frequency. The area has high water velocities due to the narrow river width at rive mile 25 which may have a negative impact on SAV recruitment and growth. Some soil erosion or deposition may occur due to altered shoreline and lack of SAV. The area experiences use by aquatic species as travel corridor but greatly reduced residence due to the sparse SAV beds. Water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels. .
With Mitigation: Reduction to nutrient input would reduce water quality imparment. Increased SAV growth and density would allow for increase to organism use of area as residence. Increased SAV bed growth and density may reduce local soil erosion.

.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 4	with: 5

Plant species include SAV as appropriate for existing salinity, turbidity, and water flow conditions. Plant conditions in this area are generally poor and sparse due to existing stress conditions. Regeneration and recruitment, and age and size distribution of V. americana is minimal. A moderate degree of algal growth exists
With Mitigation: Expected that SAV condition would improve due to nutrient reduction. Regeneration and recruitment would increase as light stress is reduced. Algal blooms would decrease with reduced nutrient input.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.17	with: 0.27

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas

Delta = [with-current]
0.1

If mitigation
Time lag (t-factor) =
Risk factor = 2

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.05

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / River Mile 26-31		Submerged Aquatic Vegetation - V. americana - River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 5 — with: 6	SAV beds are sparse and somewhat intermittent with an estimated abundance of SAV covering approximately 108.5 acres in this area. The area support to wildlife by outside habitat is minimal downstream but moderate support upstream. Wildlife access to and from outside is open although moderate salinity barrier exists downstream. Adverse impacts of land uses outside assessment area are due to littoral development with altered shoreline and presence of boat traffic. The area offers moderate benefits to downstream. With Mitigation: The area would experinece a benefit from the proposed nutrient reduction mitigation. SAV stress would be alieviated by reduction in nutrient concentrations and increase in water quality with subsenquent increase light penetration. Area would provide increased benefits to downstream.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 5 — with: 6	SAV in area expected to experience frequent, moderate to extreme salinity stress - 11-35% frequency. Water levels and flow in the area would be appropriate for V. americana growth. Some soil erosion or deposition may exist due to and altered shoreline. The area experiences use by species as travel corridor and moderate residence due to sparse SAV. Water quality expected impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels. With Mitigation: Reduction to nutrient input would reduce water quality imparment. Increased SAV growth and density would allow for increase to organism use of area as residence. Increased SAV bed growth and density may reduce local soil erosion.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 5 — with: 6	Plant species include SAV as appropriate for existing salinity, turbidity, and water flow conditions. Regeneration and recruitment expected moderate to minimal. Age and size distribution are partially atypical and indicative of permanent deviation from normal succession on V. americana. Plant condition generally moderate to sparse. Moderate degree of algal growth expected. With Mitigation: Expected that SAV condition would improve due to nutrient reduction and subsequent increase in water quality. Regeneration and recruitment would increase as light stress is reduced. Algal blooms would decrease with reduced nutrient input.

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.5 — with: 0.6	Preservation adjustment factor =	
	Adjusted mitigation delta =	

Delta = [with-current]	If mitigation	For mitigation assessment areas
0.1	Time lag (t-factor) =	RFG = delta/(t-factor x risk) = 0.05
	Risk factor = 2	

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / River Mile 31-35		Submerged Aquatic Vegetation - V. americana - River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 8

SAV beds are persistent yet still experience salinity stress, with an estimated abundance of SAV covering approximately 104.7 acres in this area. The area support to wildlife by outside habitat is moderate downstream with good support upstream. Wildlife access to and from outside is open with a minimal salinity barrier downstream. Adverse impacts of land uses outside assessment area due to littoral development with altered shoreline and presence of boat traffic. Area offers good benefits to downstream.
With Mitigation: Area is expected to benefit from upstream nutrient reduction. SAV would be alieviated by reduction in nutrient concentrations and increase in water quality and subsenquent enhanced growth due to increase light penetration. Area would provide increased benefits to downstream.

.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 7	with: 8

Valisineria in area experiences moderate to extreme salinity stress - 1-15% frequency. Water levels and flow are appropriate for V. americana growth. Some soil erosion or deposition may exist due to altered shoreline. Vegetation community zonation is appropriate. Use by species high due to persistent SAV beds. Water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels.
With Mitigation: Reduction to nutrient input would reduce water quality imparment. Increased SAV growth and density would allow for increase to organism use of area as residence. Increased SAV bed growth and density may reduce local soil erosion.

.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 7	with: 8

Majority plant species include submerged aquatic vegetation as appropriate for existing salinity, turbidity, and water flow conditions. Regeneration and recruitment near-normal. Age and size distribution with no indication of permanent deviaion but may have temporary deviaions. Plant condition generally good. Moderate degree of algal growth.
With Mitigation: Expected that SAV condition would improve due to nutrient reduction. Regeneration and recruitment would increase as light stress is reduced. Algal blooms would decrease with reduced nutrient input.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.7	with: 0.8

Delta = [with-current]
0.1

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor = 2

For impact assessment areas

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.05

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / River Mile 35-57		Submerged Aquatic Vegetation - V. americana - River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 8	with: 9

:SAV beds in this area are persistent, only experiencing moderate to extreme salinity stress on minimal and infrequent basis. Area support to wildlife by outside habitat is good downstream with excellent support upstream. Wildlife access to and from outside is open with a minimal/negligible salinity barrier downstream. Adverse imacts of land uses outside assessment area due to presence of boat traffic and existing channel. Area offers excellent benefits to downstream.
With Mitigation: Area is expected to benefit from upstream nutrient reduction. SAV would be alieviated by reduction in nutrient concentrations and increase in water quality and subsenquent increase light penetration. Area would provide increased benefits to downstream.

.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 8	with: 9

V. americana in area experiences moderate to extreme salinity stress - 0-5% frequency. Water levels and flow appropriate. Some soil erosion/deposition may exist local channel and altered shoreline. Vegetation community zonation appropriate. Use by species high. Water quality includes impared river for nutrients. Minimal/negligible salinity stess.
With Mitigation: Reduction to nutrient input would reduce water quality imparment. Increased SAV growth and density would allow for increase to organism use of area as residence. Increased SAV bed growth and density may reduce local soil erosion.

.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 8	with: 9

Majority plant species expected appropriate and desirable. Regeneration and recruitment normal and natural. Age and size distribution with no indication of permanent deviaion. Plant condition generally good. Moderate degree of algal growth.
With Mitigation: Expected that SAV condition would improve due to nutrient reduction. Regeneration and recruitment would increase as light stress is reduced. Algal blooms would decrease with reduced nutrient input.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.8	with: 0.9

Delta = [with-current]
0.1

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor = 2

For impact assessment areas

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.05

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Submerged Aquatic Vegetation - River Mile 24.5-26

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
		Impact	2.9

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Lower St. Johns River	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

River miles 24.5 to 26 are located in the Lower St. Johns River

Assessment area description

This area covers the LSJR from approximately River Mile 24.5 to 26 (approximately the Fuller Warren Bridge to 1.5 river miles upstream). SAV beds are sparse and extremely intermittent in this area with an estimated abundance of SAV covering approximately 2.9 acres in this area (approximately 1.9 acres/mile).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This area is located in downtown Jacksonville, FL. The river in this area contains significant shoreline development, both residential and commerical.	The area is not unique and is typical of the esturine environment in this section of the Lower St. Johns River.

Functions	Mitigation for previous permit/other historic use
SAV functions as habitat, foraging, and nurseries for aquatic organisms although sparse SAV in this area due to stressor such as water flow rates, salinity, water quality, shoreline development will limit SAV functions. The river serves as a travel corridor for aquatic organisms.	The site has not been utilized as mitigation and has functioned historically as a natural area.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by fish and macroinvertebrates, along with other aquatic organisms, and wading and migratory birds.	The site may be utilized by the West Indian Manatee (E)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Joelle Verhagen	15-Apr-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / River Mile 24.5-26		Submerged Aquatic Vegetation - V. americana - St. Johns River Main Stem
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	15-Apr-13

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 4	with: 2
Future without project: SAV beds are sparse and extremely intermittent with an estimated abundance of SAV covering approximately 2.9 acres in this area. The area support to wildlife by outside habitat is expected to be minimal due to lack of SAV downstream and sparse, stressed SAV beds immediately upstream. Wildlife access to and from this area would be open although a significant salinity barrier exists downstream. Significant, adverse impacts of land uses outside assessment area due to littoral development with altered shoreline and presence of boat traffic. The area offers minimal benefits to downstream. Future with project: Access to and from outside would remain open although a salinity barrier of greater concentration would exist downstream. Area support to wildlife by outside habitat expected to remain minimal. Impacts of land uses outside assessment area due to littoral development with altered shoreline and presence of boat traffic would not change with project conditions. Area would offer less than minimal benefits to downstream. Some permanent loss of SAV beds in this area may be expected due to already stressed conditions.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 3	with: 1
Future without project: SAV in area will experiences frequent, moderate to extreme salinity stress at 26-45% frequency. The area has high water velocities due to the narrow river width at rive mile 25 which may have a negative impact on SAV recruitment and growth. Some soil erosion or deposition may occur due to altered shoreline and lack of SAV. The area experiences use by aquatic species as travel corridor but greatly reduced residence due to the sparse SAV beds. Water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels. Future with project: With project conditions, SAV in the area will experience frequent, moderate to extreme salinity stress of 26-50% frequency (up to a 9% increase in stress from the future without project conditions). With project the area would continue to have high water velocities due to the narrow river width at river mile 25 which would continue to have an impact on SAV recruitment and growth. Some soil erosion or deposition may still exist due to the altered shoreline. The area would still experience use by species as a travel corridor but reduced due to potential reduction in SAV abundance in the area. Water quality may still be impaired for nutrients and would consist of higher salinity concentrations causing additional stress to local *V. americana* community.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 4	with: 2
Future without project: Plant species include SAV as appropriate for existing salinity, turbidity, and water flow conditions. Plant conditions in this area are generally poor and sparse due to existing stress conditions. Regeneration and recruitment, and age and size distribution of *V. americana* is minimal. A moderate degree of algal growth exists. Future with project: With project conditions, plant species would become less appropriate due to slight increase in salinity. Plant conditions overall would be very poor and sparse. Regeneration and recruitment would be minimal to not present. Age and size distribution would be atypical and indicative of permanent deviation from normal succession on *V. americana*. Moderate degree of algal growth may exist.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.37	with: 0.17

Delta = [with-current]
0.2

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0.2*2.9= 0.6

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Submerged Aquatic Vegetation - River Mile 26-31

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
		Impact	108.5

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Lower St. Johns River	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

River miles 26 to 31 are located in the Lower St. Johns River

Assessment area description

This area covers the LSJR from approximately River Mile 26 to 31 (approximately 1.5 river miles upstream of the Fuller Warren Bridge to NAS-JAX). SAV beds are sparse and somewhat intermittent with an estimated abundance of SAV covering approximately 108.5 acres in this area (approximately 21.7 acres/mile).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This area is located just upstream of downtown Jacksonville, FL. The river in this area is line with residential shoreline development, along with Naval Air Station-Jacksoville along the west bank. The area includes the mouth of the Ortega River and Fishweir Creek tributaries.	The area is not unique and is typical of the esturine environment in this section of the Lower St. Johns River.
Functions SAV in this portion of the river functions as habitat, foraging, and nurseries for aquatic organisms. The river serves as a travel corridor for aquatic organisms.	Mitigation for previous permit/other historic use The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) The site is likely utilized by fish and macroinvertebrates, along with other aquatic organisms, and wading and migratory birds.	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) The site may be utilized by the West Indian Manatee (E)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Joelle Verhagen	15-Apr-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Sparse SAV / RM 26-31		Submerged Aquatic Vegetation - V. americana - St. Johns River Main Stem
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 5 — with: 5	Future without project: SAV beds are sparse and somewhat intermittent with an estimated abundance of SAV covering approximately 108.5 acres in this area. The area support to wildlife by outside habitat is minimal downstream but moderate support upstream. Wildlife access to and from outside is open although moderate salinity barrier exists downstream. Adverse impacts of land uses outside assessment area are due to littoral development with altered shoreline and presence of boat traffic. The area offers moderate benefits to downstream. Future with project: The with project conditions would not cause effects to Location and Landscape Support sufficiently different from without project conditions.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 5 — with: 4	Without project: *V. americana* in area expected to experience frequent, moderate to extreme salinity stress - 11-35% frequency. Water levels and flow in the area would be appropriate for *V. americana* growth. Some soil erosion or deposition may exist due to and altered shoreline. The area experiences use by species as travel corridor and moderate residence due to sparse SAV. Water quality expected impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels. With project: The with project conditions, *V. americana* in area would experience frequent, moderate to extreme salinity stress at 11-40% frequency (a 5% increase in stress from the future without project conditions). Water levels and flow expected appropriate. Some soil erosion/deposition may exist local channel dredging and altered shoreline. Use by species expected above minimal. Water quality impared river for nutrients. Slight increased salinity stress to *V. americana*. Due to the slight percentage of increase stress frequency for this area, loss of SAV is expected to be only minimally different from without project conditions.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 5 — with: 4	Future without project: Plant species include SAV as appropriate for existing salinity, turbidity, and water flow conditions. Regeneration and recruitment expected moderate to minimal. Age and size distribution are partially atypical and indicative of permanent deviation from normal succession on *V. americana*. Plant condition generally moderate to sparse. Moderate degree of algal growth expected. Future with project: Plant species would be less appropriate due to increased salinity. Regeneration and recruitment would be minimal. Age and size distribution would be atypical and indicative of permanent deviation from normal succession on *V. americana*. Plant condition would be generally moderate to sparse. Moderate degree of algal growth may be present. Due to the slight percentage of increase stress frequency for this area, loss of SAV is expected to be only minimally different from without project conditions.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres: 0.5 — with: 0.43

Delta = [with-current]
0.07

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0.07*108.5 = 7.6

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Submerged Aquatic Vegetation - River Mile 31-35

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
		Impact	104.7

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Lower St. Johns River	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

River miles 31 to 35 are located in the Lower St. Johns River

Assessment area description

This area covers the LSJR from approximately river mile 31 to river mile 35 (approximately NAS-JAX to 1 river mile upstream of the Buckman Bridge). SAV beds are persistent yet still experience salinity stress, with an estimated abundance of SAV covering approximately 104.7 acres in this area (approximately 26.2 acres/mile).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This area is located upstream of downtown Jacksonville, FL. The river in this area has residential shoreline development, along with Naval Air Station-Jacksoville along the west bank.	The area is not unique and is typical of the esturine environment in this section of the Lower St. Johns River.

Functions	Mitigation for previous permit/other historic use
SAV in this portion of the river functions as habitat, foraging, and nurseries for aquatic organisms. The river serves as a travel corridor for aquatic organisms.	The site has not been utilized as mitigation and has functioned historically as a natural area.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by fish and macroinvertebrates, along with other aquatic organisms, and wading and migratory birds.	The site may be utilized by the West Indian Manatee (E)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Joelle Verhagen	15-Apr-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Stressed/ Persistent SAV /RM 31-35		Submerged Aquatic Vegetation - V. americana - River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 7 — with: 7	Future without project: SAV beds are persistent yet still experience salinity stress, with an estimated abundance of SAV covering approximately 104.7 acres in this area. The area support to wildlife by outside habitat is moderate downstream with good support upstream. Wildlife access to and from outside is open with a minimal salinity barrier downstream. Adverse impacts of land uses outside assessment area due to littoral development with altered shoreline and presence of boat traffic. Area offers good benefits to downstream. Future with project: The with project conditions would not cause effects to Location and Landscape Support sufficiently different from without project conditions.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 — with: 6	Future without project: Valisineria in area experiences moderate to extreme salinity stress - 1-15% frequency. Water levels and flow are appropriate for V. americana growth. Some soil erosion or deposition may exist due to altered shoreline. Vegetation community zonation is appropriate. Use by species high due to persistent SAV beds. Water quality is impaired for nutrients as determined by elevated chlorophyll a and Trophic State Index (TSI) levels. Future with project: Valisineria in area experiences moderate to extreme salinity stress - 1-20% frequency (up to 5% stress increase over without project conditions.) Water levels and flow expected appropriate. Some soil erosion/deposition may exist local channel dredging and altered shoreline. Vegetation community zonation appropriate. Use by species high. Water quality includes impared river for nutrients with some increased salinity stress.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 — with: 6	Future without project: Majority plant species include submerged aquatic vegetation as appropriate for existing salinity, turbidity, and water flow conditions. Regeneration and recruitment near-normal. Age and size distribution with no indication of permanent deviaion but may have temporary deviaions. Plant condition generally good. Moderate degree of algal growth. Future with project: Majority plant species would be appropriate. Regeneration and recruitment less than near-normal. Age and size distribution with majority indication of no permanent deviaion but may have temporary deviaions. Plant condition generally good. Moderate degree of algal growth.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres: 0.7 — with: 0.63

Delta = [with-current]
0.07

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0.07*104.7 = 7.3

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Submerged Aquatic Vegetation - River Mile 35-37

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
		Impact	80.5

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Lower St. Johns River	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

River miles 35 to 37 are located in the Lower St. Johns River

Assessment area description

This area covers the LSJR from approximately river mile 35 to river mile 37 (approximately 1 mile upstream of the Buckman Bridge to Doctors Lake). SAV beds in this area are persistent; only experiencing moderate to extreme salinity stress on minimal and infrequent basis. These two miles contain an estimated abundance of SAV covering approximately 104.7 acres (approximately 40.3 acres/mile).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This area is located upstream of downtown Jacksonville, FL, just north of the mouth of Doctors Lake. The river in this area has residential shoreline development.	The area is not unique and is typical of the esturine environment in this section of the Lower St. Johns River.
Functions	**Mitigation for previous permit/other historic use**
SAV in this portion of the river functions as habitat, foraging, and nurseries for aquatic organisms. The river serves as a travel corridor for aquatic organisms.	The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by fish and macroinvertebrates, along with other aquatic organisms, and wading and migratory birds.	The site may be utilized by the West Indian Manatee (E)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Joelle Verhagen	15-Apr-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor Deepening - Stressed/ Persistent SAV /RM 35-37		Submerged Aquatic Vegetation - V. americana - St. Johns River Main Stem
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Joelle Verhagen	15-Apr-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 8 — with: 8	Future without project: SAV beds in this area are persistent, only experiencing moderate to extreme salinity stress on minimal and infrequent basis. There are an estimated abundance of SAV covering approximately 80.5 acres. Area support to wildlife by outside habitat is good downstream with excellent support upstream. Wildlife access to and from outside is open with a minimal/negligible salinity barrier downstream. Adverse imacts of land uses outside assessment area due to presence of boat traffic and existing channel. Area offers excellent benefits to downstream. Furure with project: The with project conditions would not cause effects to Location and Landscape Support sufficiently different from without project conditions.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 8 — with: 7	Without project: *V. americana* in area experiences moderate to extreme salinity stress - 0-5% frequency. Water levels and flow appropriate. Some soil erosion/deposition may exist local channel and altered shoreline. Vegetation community zonation appropriate. Use by species high. Water quality includes impared river for nutrients. Minimal/negligible salinity stess. With project: *V. americana* in area experiences moderate to extreme salinity stress - 0-10% frequency. Water levels and flow appropriate. Some soil erosion/deposition may exist local channel and altered shoreline. Vegetation community zonation appropriate. Use by species high. Water quality includes impared river for nutrients. Slight increase in salinity stress.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 8 — with: 7	Without project: Majority plant species expected appropriate and desirable. Regeneration and recruitment normal and natural. Age and size distribution with no indication of permanent deviaion. Plant condition generally good. Moderate degree of algal growth. With project: Majority plant species are appropriate and desirable. Regeneration and recruitment near-normall. Age and size distribution with no minimal indication of permanent deviaion. Plant condition generally good. Moderate degree of algal growth.

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.8	with: 0.73

Delta = [with-current]
0.07

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 0.07*80.5 = 5.6

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jax Harbor GRR2		Trout River

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
22161		Impact	62.27 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	Durbin Creek	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Durbin Creek is a tributary of and receives tidal flows from the St. Johns River.

Assessment area description

The area encompasses the forested, tidal floodplain of Durbin Creek. The area has excellent hydrology and buffers are present along most of the wetlands. Trees are fairly mature and ground cover is full and appropriate. Habitat utilization is high with large reptiles, deer, wading birds and high fish populations.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Julington Creek is within an area that has experienced heavy growth but existing regulations have sufficiently conserved wetland areas. There are several conservation areas in the close vicinity.	The area is not unique and is typical of other tidal wetlands within the lower St. Johns River basin.
Functions	**Mitigation for previous permit/other historic use**
The Julington Creek wetlands function as floodwater storage, water filtration and water quality improvements, and wildlife habitat among others.	The site has not been utilized as mitigation and has functioned historically as a natural area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The site is likely utilized by wading and migratory birds, reptiles, amphibians and small and large mammales. The aquatic environment is high quality and sustains excellent fish populations.	The site is utilizated by manatees, an Endangered Species.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators and numerous wading and migratory birds were observed during a site visit. Many fish were seen in the water with many breaking the surface.

Additional relevant factors:

Some tree mortality can be observed within the mouth of Julington/Durbin Creek, which could be due to rising salinity levels in the area. Durbin Creek serves a large drainage basin and some saltwater influence is likely mitigated by immense freshwater flows that come out of the basin during rainfall events. Stormwater facilities are typically appropriate to handle nutrient loads from residential development.

Assessment conducted by:	Assessment date(s):
Ray Wimbrough	12-May-13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Jacksonville Harbor GRR2		Trout River
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Ray Wimbrough	8-May-13

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 6
Support to wildlife is moderate for aquatics and minimal for wetland dependent species. No exotics were observed. Wildlife access is limited by barriers on land, no barriers in aquatic area. No hydrologic impediments exist, downstream habitats are tidal and do receive benefits from discharges. With project, downstream benefits would likely decrease with increasing transition to saltwater system. No changes in barriers or colonization by exotics likely. Support to wildlife would likely remain similar to existing conditions.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 7	with: 5
Water levels and flows are appropriate, no evidence of soil erosion or deposition. Hydrologic stress was observed likely due to increasing salinities and lack of freshwater input due to elimination of headwaters by development. Plant community composition is mixed, with salt tolerant species located near open water areas. Water quality is impaired in this area. With project, increased soil subsidence likely in areas near open water, shifts in community zonation likely to occur. Water levels and flows would remain appropriate.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 7	with: 6
Plant species appropriate with no exotics observed. Regeneration and recruitment likely affected by salinities. Topographic features present. Plant condition less healthy towards open water. With project, transition would lilkely increase with additional mortality and stunting of trees. Further landward shift toward salt tolerant vegetation would occur, plant species in ground cover.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.7	0.56

Delta = [with-current]
0.14

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = 3.06

For mitigation assessment areas
RFG = delta/(t-factor x risk) =